



SKOKHOLM

BIRD OBSERVATORY



South and West Wales
De a Gorllewin Cymru

Seabird Report 2018

A summary of the status of seabirds breeding on Skokholm in 2018.

The lower limits given here, taken from the Skokholm Island Management Plan, have been established by the Wildlife Trust of South and West Wales and endorsed by the Seabird Subgroup of the Islands Conservation Advisory Committee. A green box is an attribute above its lower limit, a red box an attribute below the lower limit stipulated in the plan.

		Whole Island or Annual Plot Total (2017-2014 in parenthesis)	Productivity (2017-2014 in parenthesis)
Storm Petrel		Study plot population: any measurable decrease in the population	
Population	Not set	Productivity: limit not yet set due to a lack of data	
		83 transect responses (89, 76, 87, 82)	0.55 (0.50, 0.58, 0.55, 0.69)
Fulmar		Whole Island population: not to drop below the 2013-2017 mean of 187	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.50 chicks per breeding pair	
		217 aia (213, 194, 179, 179)	0.49 (0.45, 0.57, 0.47, 0.53)
Manx Shearwater		Study plot population: any measurable decrease in the population	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.69 chicks per breeding pair	
		373 responses in 8000m ² (295, 297, 269, 241)	0.70 (0.80, 0.68, 0.68, 0.63)
Great Black-backed Gull		Whole Island population: not to drop below the 2013-2017 mean of 85	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 1.10 chicks per breeding pair	
		93 nests (93, 93, 83, 84)	1.40 (1.54, 1.38, 1.66, 0.93)
Herring Gull		Whole Island population: not to drop below the 2013-2017 mean of 295	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.70 chicks per breeding pair	
		320 nests (302, 322, 289, 300)	0.73 (0.70, 0.86, 0.66, 0.70)
Lesser Black-backed Gull		Whole Island population: 3 in any 5 consecutive years with less than 4600 pairs	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.60 chicks per breeding pair	
		1069 aia (1123, 1397, 1486, 1588)	0.63 (0.38, 0.23, 0.15, 0.30)
Guillemot		Whole Island population: not to drop below the 2013-2017 mean of 3714	
Population	Not set	Productivity: not monitored on Skokholm	
		4316 aol (4038, 3949, 3603, 3512)	- (0.55-0.61 in 2013)
Razorbill		Whole Island population: not to drop below the 2013-2017 mean of 2292	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.80 chicks per breeding pair	
		2585 aol (2491, 2242, 2382, 2052)	0.69 (0.40, 0.39, 0.21, 0.40)
Puffin		Whole Island population: not to drop below the 2013-2017 mean of 6212	
Population	Productivity	Productivity: 3 in any 5 consecutive years with less than 0.74 chicks per breeding pair	
		8762 adults (7800, 6692, 6665, 5070)	0.75 (0.80, 0.73, 0.75, 0.74)

Storm Petrel *Hydrobates pelagicus*

Pedryn Drycin

Abundant Breeder a 2016 whole Island survey predicted 1910 occupied sites

956 trapped (including 10 pulli), 87 retrapped, 38 controls

1936-1976: 18,526 trapped, 2011-2017: 3136 trapped, 234 retrapped, 124 controls

Despite the sizable breeding population on Skokholm, Storm Petrels usually prove a rare sight at sea, indeed the 43 birds logged over seven dates in 2017 involved an outstanding series of seawatching records; a single, watched heading west off the Lighthouse on 15th August this year, was a more typical annual total. With the exception of a small number of incubating adults visible in shallow crevices or in nest boxes, all other 2018 sightings came at night, although birds occasionally called from holes during the day and vocal responses were elicited for monitoring purposes. A minimum of ten birds watched after dark at the Quarry on 6th May was the first record of the year, 16 days later than the first of 2017. The first diurnal record was of three birds calling from crevices around the Farm buildings on 8th May, 15 days later than the first of 2017 but on the same date as the first of 2016. Nights in May saw small numbers logged at various locations around the Island and infrared viewing equipment allowed counts to be made at the Quarry of at least 150 on the 19th and 110 on the 27th. A visit to the Bluffs Peregrine nest on 2nd June located two Storm Petrels calling from a

crevice at the back of the ledge; the only apparent access was past the Peregrines. There were further peak counts from the Quarry of at least 120 birds on the 13th and 27th June and on 1st July.

Four playback transects established at the Quarry in 2010, along with plots in North Haven Gully and along two of the walls which radiate from the Farm, seemingly provide a sound method for monitoring changes in the Skokholm population. Between 90 and 130 responses were elicited using MP3 playback at these sites in each of the years between 2010 and 2017, although a substantial rock slide in 2016 significantly reduced the area which could be surveyed that year; Quarry transect two, which holds between eight and 21 responding birds, was almost entirely destroyed in 2016 and Quarry transect one was undercut on its southern edge, rendering both transects too dangerous to survey (see the 2016 Seabird Report for photographs and further details). It would seem from the records that the 2016 Quarry rock fall was by far the largest such event for over 30 years. Visits to the Quarry in 2017 established that there had been no further significant slides on any of the transects and the decision was made to reinstate transect one entirely and to use the upper section of transect two, a situation which remained the same this year. It was decided in 2017 that all of the data previously collected for transects one and two would be compared directly with future years; no adjustments have thus been made for the fact that transect two was shorter this year and in 2017 and that transects one and two were missed in 2016.



We were joined by a Storm Petrel researcher this year, with Katherine Westerberg accompanying staff and long-term volunteers to allow the survey work to be completed in the usual period. Ten visits were made to the study areas between 12th June and 11th July. An MP3 recording of male song was played into every crevice encountered along the transects, both numbered (and therefore used previously) and unmarked, with each crevice from which a response was elicited being recorded and marked if new. It was first noted in 2013 how some marked burrows had deviated from the two metre wide transects and in 2014 the data collected since 2010 was reassessed to bring it back in line with the original protocol. As has been the case since 2014, the playback census this year was focused on the area of the transects delineated by marked burrows, although the results were then

divided into those which fell within the true two metre transect and those which fell just outside (see table below). It should be noted in future surveys that some numbered crevices which were once within the two metre transects, and which were confirmed as such during the 2014 re-evaluation, now lie outside of the survey area due to further natural movements.

The total number of apparently occupied crevices (located over ten visits) responding to a recording of male song at each of the seven study sites. Numbers in parenthesis are the totals from the 2m wide Quarry transects (as stipulated in the project guidelines) as opposed to the more wayward crevices included since the project's inception. The mean is that from 2010-2018.

Year	North Pond Wall	Little Bay Wall	North Haven Gully	Quarry transect 1	Quarry transect 2	Quarry transect 3	Quarry transect 4	Quarry total	Total						
2018	6	13	11‡	15 (5)	15† (10)†	12 (8)	49 (30)	91 (53)	121 (83)						
2017	7	20	14‡	15 (5)	13† (7)†	10 (9)	47 (27)	85 (48)	126 (89)						
2016	6	15	17	9* (4)*	** **	11 (8)	41 (26)	61 (38)	99 (76)						
2015	7	17	17	14 (5)	21 (9)	12 (7)	42 (25)	89 (46)	130 (87)						
2014	9	12	13‡	14 (5)	18 (9)	18 (12)	37 (22)	87 (48)	121 (82)						
2013	8	15	22	14 (4)	15 (8)	10 (7)	46 (27)	85 (46)	130 (91)						
2012	5	9	21	12 (5)	8 (4)	10 (5)	33 (17)	63 (31)	98 (66)						
2011	7	5	19	11 (5)	13 (8)	10 (7)	25 (14)	59 (34)	90 (65)						
2010	4	9	18	8 (5)	15 (12)	11 (8)	30 (17)	64 (42)	95 (73)						
Mean	6.6	12.8	16.9	12.4	4.8	14.8	8.4	11.6	7.9	38.9	22.8	76.0	42.9	112.2	79.1

* Transect 1 was only visited on four occasions in 2016 due to safety concerns.

** Transect 2 was not visited in 2016 due to a rock fall.

† Transect 2 was shortened in 2017 due to the 2016 rock fall.

‡ There was substantial scouring in the winters of 2013-14 and 2016-17 and in October 2017.

A significant decline in the number of apparently occupied crevices was observed along Little Bay Wall, indeed a drop of seven was, with the exception of that seen in North Haven Gully following the substantial scouring event of winter 2013-2014, the largest decline observed at any site since 2011; there was however no obvious habitat related explanation for this latest drop in numbers. Interestingly there was a substantial increase at this site last year, an increase which may have been due to a rise in the number of transient, non-breeding birds (Brown and Eagle, 2017). There is a general consensus that the number of pairs utilising the 18th century herringbone walls on Skokholm has declined (Vaughan and Gibbons, 1996; Vaughan, 2001; Thompson, 2003; Sutcliffe, 2010), perhaps due to a loss of suitable nest sites as vegetation and soil fills gaps in the collapsing walls. However, despite the drop in numbers seen this year, 19 elicited responses was only fractionally down on the 2010-2018 mean (19.3 ±sd 5.3); while the 2018 total was the lowest since 2012, the number of responses has fluctuated widely over the last nine years. It would seem that the walls population can still be cautiously regarded as stable, as has been the case for nearly a decade.

The huge swell generated by Storm Ophelia in October 2017, the remnants of the easternmost major Atlantic hurricane on record, caused yet another scouring event in North Haven Gully. Nest boxes installed by Whittington in 2014, the access ladder to the lower portion of the slope and the central section of boulder scree which traditionally held many active crevices were all destroyed, whilst the painted marker stones were again moved from their original locations. This was the third major change to the North Haven landscape in five years, a series of events which has almost certainly contributed to a 38.9% decline in the number of occupied crevices located between 2010 and 2018. Only 11 responses were elicited this year, the lowest total since standardised survey work began in 2010. An ad hoc assessment of current breeding site availability suggests that new crevices have not opened up as others have been destroyed, with recent weather events releasing soil from further up the gully which has seemingly reduced the number of open fissures. How events such as

this effect the Skokholm population as a whole is unclear; it would seem likely that nest sites are available away from North Haven and that the birds were not directly impacted (as they were predominantly absent during the scouring events), however the impact of looking for new nest sites on adult survival is something of an unknown. That seven Short-eared Owl victims were located in North Haven between 26th June and 8th July may have also impacted the number of responses.

Although the ephemeral nature of Storm Petrel nest sites has also been evident at the Quarry, primarily due to the 2016 rock fall, the study population here continued to expand. The number of responses elicited along transect one was identical to 2017, indeed the five active crevices found along the two metre wide transect was the same as in seven of the last nine years (this despite the shift in rocks documented in 2016). Surprisingly the number of responses along transect two was the most since 2010, this despite the fact that the lower section can no longer be safely accessed; it was suggested last year that the 2016 rock fall may have displaced breeders into the upper section of the transect, as still seemed to be the case this year. The number of birds along transect three has remained relatively constant over the last nine years, this despite the 2016 rock fall at its westerly edge; the eight sites located this year was almost identical to the 2010-2018 mean (7.9 ±sd 1.9). Transects three and four have been regarded as two of the most static survey areas in recent years, however several small scale movements had occurred at the bottom of transect four at some point between the 2017 and 2018 survey periods. Nevertheless the number of responses elicited along transect four was the most to date, with 30 occupied sites being a 76.5% increase on the number found in the first year of survey work and a 31.6% increase on the 2010-2018 mean (22.8 ±sd 5.6). In total there were five more active sites located along the Quarry transects, with the 53 responses being a new record and 23.5% up on the 2010-2018 mean (42.9 ±sd 7.2).

The number of crevices which have at some point been occupied over the nine year study (a total of 303), subdivided to show how many years the crevices have been apparently occupied for and the percentage of crevices occupied for a particular number of years. Crevices in the lower half of transect two, not visited after the 2016 rock fall, are not included in this table.

	Quarry Transects	The Walls	North Haven Gully	Total	% of total
1 year of apparent occupancy	56	32	26	114	37.62
2 years of apparent occupancy	24	5	16	45	14.85
3 years of apparent occupancy	10	8	9	27	8.91
4 years of apparent occupancy	15	7	10	32	10.56
5 years of apparent occupancy	23	6		29	9.57
6 years of apparent occupancy	12	2	2	16	5.28
7 years of apparent occupancy	17	3	1	21	6.93
8 years of apparent occupancy	7	1		8	2.64
9 years of apparent occupancy	9	1	1	11	3.63
Total	173	65	65	303	

Overall there were 83 responses elicited this year, six fewer than last year (the increase of five at the Quarry being offset by 11 fewer sites across the walls and North Haven). Nevertheless the total was the fourth highest to date and 4.9% up on the mean (79.1 ±sd 9.6). It still seems likely that the Skokholm study population can be regarded as stable, a conclusion which is probably applicable to the Island population as a whole. This is positive news following what may have been a significant population decline between 1996 and 2010 (Sutcliffe and Vaughan, 2011, Wood *et al*, 2017). Perhaps the most important variable highlighted this year was nest site availability within the study areas; birds can only react to the changing landscape and maintain a stable population if further nest sites open up as others are lost. It is clear that some Storm Petrel nest crevices are short lived (a third of those found over the course of this study have only been occupied during a single year), however stable sites are also in existence; over a quarter of the active crevices located during this

nine year study have shown signs of occupancy in five or more years and 3.63% of crevices have contained a calling bird in every year. Although changes in the positioning of rocks will mean that some crevices were only available for a single year, it is tempting to suggest that many of the crevices only occupied once are perhaps unsuitable nest sites, indeed such sites may have never actually supported a breeding attempt (just a calling bird).

The proportion of known active wall crevices which responded to a recording of male song during any single visit was very similar to last year but down on the previous three; whereas between 28.7% and 40.0% of active wall sites have responded in the past, the last two seasons have seen between 21.9% and 22.6% respond. This may be cause for concern as it perhaps suggests that the active crevices were occupied less frequently, hinting at an increase in the number of crevices occupied by non-breeders (birds which may leave a crevice unattended or occupy multiple crevices during the study period). In areas of rock fall (in the Quarry and North Haven Gully) the proportion of active crevices which responded on any single visit fell somewhat above that recorded in previous years (see table below). The increase in the rock fall response rate took the overall mean response rate to 31.0%, just above the relatively tight spread observed during the previous four years (between 27.1% and 30.1% of active crevices responded between 2014 and 2017). Although this overall mean response rate has proven consistent between years, there is considerable variation over the ten visits; on one occasion there were no responses from the walls and on another there were ten, whilst the number of responses at North Haven varied between one and six and at the Quarry between 13 and 39. Despite the observed variation, the use of response rates to produce a correction factor remains the best way to predict the number of birds present in a large area when ten visits are not logistically feasible (for example during the whole Island census). However the uncertainty surrounding this year's figures is a reminder of how difficult it is to assess the breeding population of a species which usually cannot be seen.

The percentage of known active crevices which responded to male song during any single visit, averaged across all visits (the resulting correction factor is given in parenthesis).

Year	The Walls	North Haven	Quarry	Rock fall	Average
2018	22.6 (4.42)	31.8 (3.14)	32.6 (3.06)	32.5 (3.07)	31.0 (3.23)
2017	21.9 (4.58)	30.9 (3.23)	28.1 (3.55)	28.5 (3.51)	27.1 (3.69)
2016	40.0 (2.50)	25.9 (3.86)	23.3 (4.30)	23.9 (4.18)	27.7 (3.61)
2015	28.7 (3.48)	37.4 (2.68)	28.9 (3.46)	30.4 (3.29)	30.1 (3.33)
2014	36.2 (2.76)	40.0 (2.50)	26.2 (3.82)	26.4 (3.79)	28.1 (3.56)

There is an obvious need to know what responding birds are actually doing; it is unclear how many of the 1910 active sites predicted during the 2016 whole Island census were actually occupied by breeding birds. Previous attempts to use an endoscope in natural sites have failed to locate a sufficiently large sample size for monitoring purposes, a failure which was repeated this year. One way to improve our knowledge is to encourage petrels to occupy accessible artificial nest sites. With this in mind a study wall containing 119 nest holes was created during the 2016 season (with the final inspection hatches and endoscope holes being added in April 2017). The early part of this season again saw the regular use of MP3 playback in an attempt to lure prospecting petrels into the crevices, a technique which proved successful on 10th July last year when a bird twice entered the wall. There was considerably more interest in the 'Petrel Station' this year, with a bird first seen to enter on the night of 11th May (a bird which lingered in three different boxes for up to two minutes). Zoe Deakin monitored the wall on most nights during this period, witnessing at least seven different individuals entering on the nights of the 13th and 14th May (including a bird singing from within the wall on the former date), a bird already present prior to playback on 18th May and one which spent the hours of daylight in the wall on 20th May. A pair were present together on the 7th, 8th and 9th June and dueting was heard on the 23rd. The MP3 playback census, conducted on the same dates as the

Quarry transect visits, elicited responses from two separate boxes. The use of an endoscope on 14th July revealed four occupied boxes, at least two of which contained birds incubating eggs. Three eggs were seen on 17th July, only one of which was being incubated, two eggs were being incubated on 21st July and three unincubated eggs were logged on the 24th and 30th July and on 13th August; one of the failures was believed to be due to other birds entering the nest chamber (as an exceedingly vocal interaction with much shuffling was sound recorded just prior to the abandonment). A fourth abandoned egg was found in the back of a box on 25th August. Although four egg stage failures is disappointing, it is quite possible that the birds involved were first time breeders; it will be interesting to see if the same boxes are occupied in the 2019 season.

In 2013 a thermal imaging camera recorded a Short-eared Owl hunting Storm Petrels in the Quarry, an event which has subsequently been shown to be quite regular. The remains of six petrels were found that year, with 16 in 2014, 18 in 2015, 51 in 2016 and 98 last year, the vast majority of which were believed to be owl victims. The increase in the number of corpses found during 2017 was primarily due to the presence, for the first time on record, of a breeding pair of Short-eared Owls on Skokholm, an attempt which went on to fledge at least two young. Both adult owls were surprisingly dark of face, probably due to oil regurgitated by Storm Petrels. Short-eared Owls did not breed this year, perhaps due to the demise of a male found following sub-zero temperatures and snow on 23rd March; there were no sightings in April, August or September and only five singles were noted between 29th May and 10th July. Despite this paucity of records, only five of the 31 Storm Petrel corpses found this year were attributed to gulls (all between 23rd July and 5th August); the majority of the remainder were thought to be the victims of Short-eared Owls due to the presence of feathers or pellets. A Little Owl logged on 17th March was fortunately not seen again; this species is a well-documented Storm Petrel predator, for example the Bird Observatory report of 1936 includes details of a Little Owl nest containing the remains of nearly 200 Storm Petrels.

On the night of 25th July a leucistic or progressively greying individual was taken from the South Haven mist net. It had a broken white breast band, a white throat and a white nape patch along with the usual white rump and underwings. Of over 4000 birds handled since 2013, this was the first to show more than a single aberrant feather. Although such individuals are clearly unusual, similar white patches are documented on occasion; a comparable bird photographed on Filfla, Malta in 2001 was recorded in a paper which mentions a few other incidences in Storm Petrels (Sultana and Borg, 2002).



There were 20 sites discovered this season where an incubating bird was evident early enough in the nesting period to allow a productivity estimate to be made (14 sites in 2017, 12 in 2016, 20 in 2015 and 13 in 2014); the Petrel Station birds were not included as it was felt that the sample could be biased towards younger, less experienced birds. Although some early egg stage failures may have been missed, the study is biased towards birds in shallow crevices or boxes and the sample size is far from great, these visible birds provide a rare opportunity to estimate productivity on Skokholm. Of the 20 monitored nests, seven failed at egg stage (two with damaged eggs, one with the egg removed from the crevice and four with deserted but intact eggs), one failed with a small chick, one failed with a large chick and 11 fledged young; productivity was thus calculated at 0.55 fledglings per pair, a figure similar to the 0.50 observed last season, the 0.58 of 2016 and the 0.55 of 2015 but down on the 0.69 recorded in 2014. The first chick was found along Quarry transect four on 6th July,

three days later than the first hatched eggshell of last year and four days later than the first hatched eggshell of 2015 but 11 days earlier than the first hatched eggshell of 2016.

Although only small numbers of accessible chicks are ringed each year on Skokholm, tape luring of adult birds in South Haven is giving some indication as to their post-fledging survival. Of 32 chicks ringed between 2013 and 2015, seven (21.9%) have been mist netted in South Haven in subsequent years (at between one year, 323 days and three years, 344 days later) and an eighth bird, ringed as a chick in October 2015, was controlled at Gwennap Head, Cornwall in July this year; thus at least eight (25.0%) of the 32 survived a minimum of two winters. Intriguingly 12 of the 32 were ringed at either the Quarry or Wall's End and have not been encountered again; although this may infer differing survival rates, it is perhaps more likely that young non-breeders return to sites close to their natal crevice, in this instance sites far enough from the South Haven tape lure that birds are not attracted. If the Quarry and Wall's End birds are removed from the equation, eight of 20 birds (40.0%) have been reencountered. If only the 2014 data is used, three of seven chicks have survived for at least one year, 323 days since being ringed (42.9%). However, of the six chicks ringed in 2016 and the seven ringed in 2017, none had been retrapped by the end of the 2018 season.



Adult Storm Petrels were lured to the traditional South Haven netting site on 14 nights between 13th July and 30th August, five more nights than in 2017, six more than in 2016 and three more than in 2015. Along with generating some fantastic data, these nights also proved very popular with guests to the Island. The largest catch was the 142 trapped on the night of 21st July; although this peak was well down on the 252 of 24th July 2017 and the 247 of 22nd July 2016, the total number of birds handled during the year was the highest of the last six. Of 1062 adults handled in South Haven this year, 11.4% were already wearing a ring (12.9% in 2017, 6.8% in 2016, 12.3% in 2015, 7.5% in 2014), there was one retrap from 2011, three from 2013, four from 2014, three from 2015, none from 2016, 31 from 2017 and 38 (3.58%) had been ringed elsewhere (4.02% in 2017, 3.03% in 2016 and 3.45% in 2015). Additional to the birds listed below, we received news of six birds ringed at Wooltack Point (4km to the NNE) retrapped on Skokholm (after 382, 27, nine, four, four and three days), two birds ringed on Skokholm and retrapped on Wooltack (one after 1068 days, the other after 21 hours and 45 minutes), four birds ringed on Skomer Island (4km to the NNW) retrapped on Skokholm (one after 1078 days which was retrapped for a second time after 1080 days and others

after 18, eight and two days) and five birds ringed on Skokholm and retrapped on Skomer (two after 347 days and others after 346, 329 and 41 days). Since ringing fully recommenced in 2013 we have now received news of 248 Storm Petrels either ringed on Skokholm and found elsewhere or ringed elsewhere and controlled on Skokholm; of these 142 have been exchanged with sites more than 10km away from the Island (see map below). Unless stated otherwise, all of the following recoveries were of birds deliberately mist netted.

Ringing recovery 2423374

Originally ringed as an adult, PORTLAND BILL, DORSET 23rd June 1994

Recovered SOUTH HAVEN, SKOKHOLM 15th July 2018

Distance travelled 238km at 304 degrees (NW)

Days since ringed 8788

At over 24 years of age, this individual has already more than doubled the average lifespan calculated using British Trust for Ornithology survival data. This is the second Portland ringed bird since 2013 to be controlled on Skokholm more than 20 years after ringing.

Ringing recovery 2498638

Originally ringed as an adult, BROWNSTOWN HEAD, WATERFORD, IRELAND 6th August 2018

Recovered SOUTH HAVEN, SKOKHOLM 10th August 2018

Distance travelled 134km at 112 degrees (ESE)

Days since ringed 4

Ringing recovery 2569904

Originally ringed as an adult, PORTH YSGADEN, GWYNEDD 9th July 2017

Recovered SOUTH HAVEN, SKOKHOLM 26th July 2018

Distance travelled 141km at 198 degrees (SSW)

Days since ringed 382

Ringing recovery 2647800

Originally ringed as an adult, BARDSEY ISLAND, GWYNEDD 25th July 2017

Recovered SOUTH HAVEN, SKOKHOLM 14th July 2018

Distance travelled 122km at 197 degrees (SSW)

Days since ringed 354

Coincidentally 2647806, ringed on Bardsey one day later than this individual, was controlled in South Haven on 15th July 2018 after the same period of 354 days.

Ringing recovery 2655569

Originally ringed as an adult, HARTLAND POINT, DEVON 27th June 2017

Recovered SOUTH HAVEN, SKOKHOLM 25th July 2018

Distance travelled 95km at 326 degrees (NNW)

Days since ringed 393

Additionally 2473701 and 2473726, both ringed at Hartland Point on 5th July 2018, were retrapped on Skokholm on 25th July and 4th August after 20 and 30 days respectively.

Ringing recovery 2661459

Originally ringed as an adult, STRUMBLE, PEMBROKESHIRE 24th June 2012

Recovered SOUTH HAVEN, SKOKHOLM 5th August 2018

Distance travelled 40km at 202 degrees (SSW)

Days since ringed 2233

This is the second individual ringed at Strumble in 2012 to be found on Skokholm, the first having been controlled on 24th August 2014.

Ringing recovery 2683366

Originally ringed as an adult, HOT POINT, THE LIZARD, CORNWALL 17th June 2015

Previously recovered SOUTH HAVEN, SKOKHOLM 16th July 2015

Previously recovered SOUTH HAVEN, SKOKHOLM 26th July 2015

Recovered SOUTH HAVEN, SKOKHOLM 4th August 2018

Distance travelled 193km at 358 degrees (N)

Days since ringed 1144

Additionally 2714404, ringed at Hot Point on 16th August 2015, was controlled on 22nd July 2018 after 1071 days, 2714578, ringed at Hot Point on 22nd June 2017, was controlled on the same date after 395 days, 2726139, ringed at Hot Point on 26th June 2017, was controlled two days later after 393 days, 2726229, ringed at Hot Point on 1st August 2017, was controlled on 19th July 2018 after 352 days and 2726255, ringed at Hot Point on 1st August 2017, was controlled on 22nd July 2018 after 355 days. In the period between 2013 and 2018 there have been 26 Lizard ringed birds controlled on Skokholm, more than from any other site.



Ringing recovery 2699054

Originally ringed as an adult, PORTLAND BILL, DORSET 5th July 2017

Recovered SOUTH HAVEN, SKOKHOLM 15th July 2018

Distance travelled 238km at 304 degrees (NW)

Days since ringed 375

Additionally 2699061, ringed at Portland on 10th July 2017, was controlled on 21st July 2018 after 376 days. Six further Portland Storm Petrels ringed 26990** have been controlled on Skokholm.

Ringing recovery 2702990

Originally ringed as an adult, ANNAGH HEAD, MAYO, IRELAND 28th July 2017

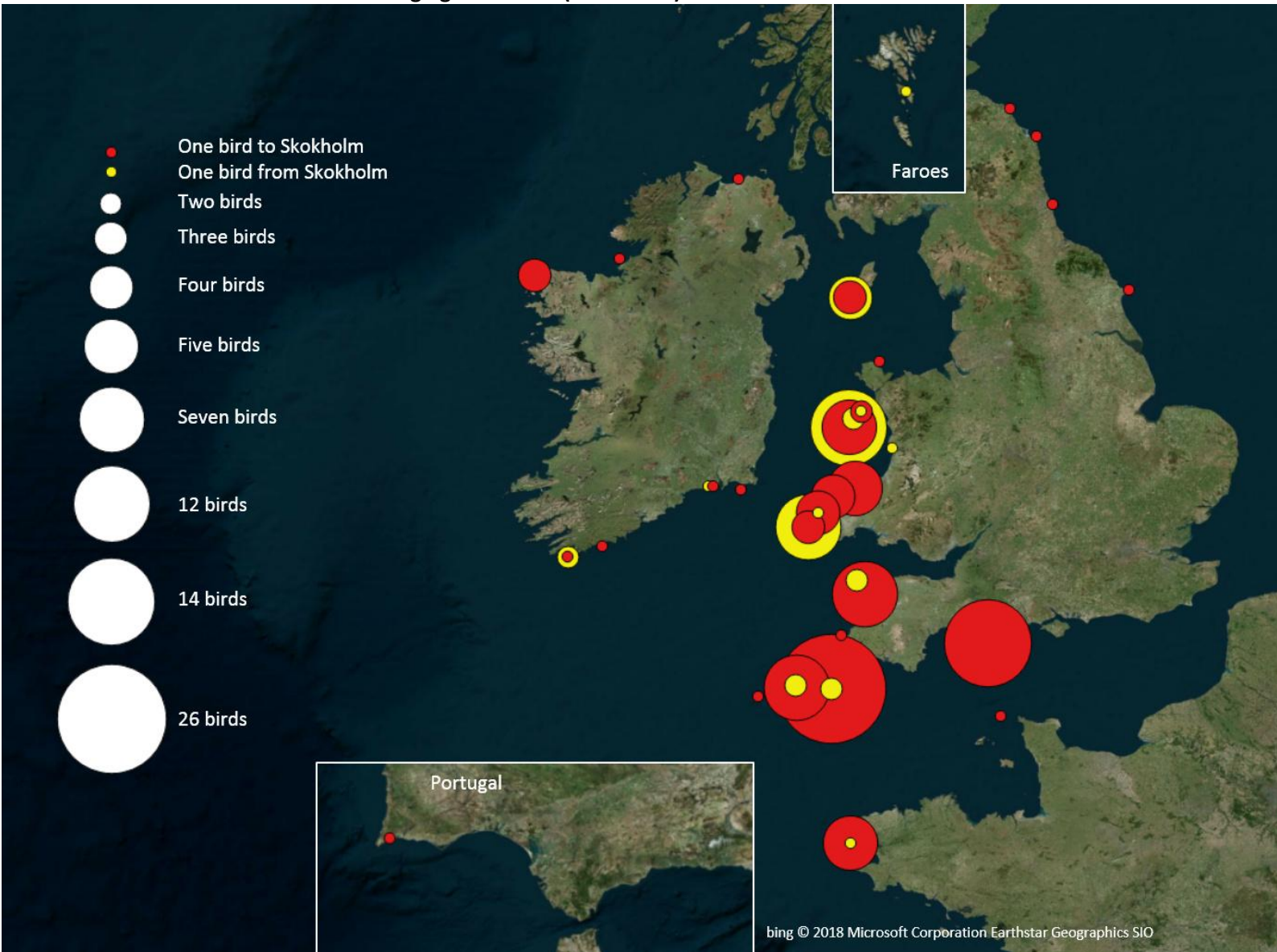
Recovered SOUTH HAVEN, SKOKHOLM 9th August 2018

Distance travelled 429km at 132 degrees (SE)

Days since ringed 377

Additionally 2753603, ringed at Annagh Head on 28th July 2018, was controlled on Skokholm on 6th August 2018 after nine days.

Storm Petrel ringing recoveries (over 10km) recorded between 2013 and 2018.



Ringing recovery 2706016

Originally ringed as a pullus, SKOKHOLM 2nd October 2015

Recovered GWENNAP HEAD, PORTHWARRA, CORNWALL 15th July 2018

Distance travelled 188km at 189 degrees (S)

Days since ringed 1017

This is the first of 32 birds ringed as chicks between 2013 and 2015 to be retrapped away from Skokholm; a further seven of the chicks have been found back on the Island. The same journey was made by 2740041, ringed on Skokholm as an adult on 14th July 2018, which had reached Gwennap Head 23 hours and ten minutes later.

Ringing recovery 2706797

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 25th July 2017

Recovered BARDSEY ISLAND, GWYNEDD 5th July 2018

Distance travelled 122km at 17 degrees (NNE)

Days since ringed 345

Additionally 2722502, ringed on Skokholm on 4th August 2017, was controlled on Bardsey on 23rd July 2018 after 353 days and 2740021, ringed on Skokholm on 14th July 2018, was on Bardsey eight days later.

Ringing recovery 2714046

Originally ringed as an adult, BALLYREAGH, LONDONDERRY, NORTHERN IRELAND 17th July 2017

Recovered SOUTH HAVEN, SKOKHOLM 11th August 2018

Distance travelled 398km at 167 degrees (SSE)

Days since ringed 390

Ringing recovery 2720208

Originally ringed as an adult, GALLEY HEAD, CORK, IRELAND 29th July 2018

Recovered SOUTH HAVEN, SKOKHOLM 4th August 2018

Distance travelled 254km at 86 degrees (E)

Days since ringed 6

Ringing recovery 2722531

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 5th August 2017

Recovered CALF OF MAN, ISLE OF MAN 18th July 2018

Distance travelled 263km at 7 degrees (N)

Days since ringed 347

Additionally 2740324, ringed on Skokholm on 25th July 2018, had reached the Calf 29 days later on 23rd August.

Ringing recovery 2722979

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 14th July 2018

Recovered CAPE CLEAR, CORK, IRELAND 27th July 2018

Distance travelled 294km at 265 degrees (W)

Days since ringed 13

Additionally 2740371, ringed on Skokholm on 25th July 2018, had reached Cape Clear on 27th July after 69 hours and 20 minutes.

Ringing recovery 2726360

Originally ringed as an adult, GWENNAP HEAD, PORTHWARRA, CORNWALL 15th July 2018

Recovered SOUTH HAVEN, SKOKHOLM 4th August 2018

Distance travelled 188km at 9 degrees (N)

Days since ringed 20

Additionally 2726369, 2726370, 2726460 and 2726480, all ringed at Gwennap Head on the same date, were controlled on Skokholm on the 5th, 11th and 4th August and 22nd July after 21, 27, 20 and seven days respectively.

Ringing recovery 2740238

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 19th July 2018

Recovered LUNDY ISLAND, DEVON 1st September 2018

Distance travelled 70km at 144 degrees (SE)

Days since ringed 44

Additionally 2740263, ringed on Skokholm on 19th July, was also controlled on Lundy 44 days later.

Ringing recovery 2740650

Originally ringed as an adult, SOUTH HAVEN, SKOKHOLM 5th August 2018

Recovered HVALNES, SKÁLAVIK, SANDOY, FAROE ISLANDS 14th August 2018

Distance travelled 1131km at 356 degrees (N)

Days since ringed 9

This is the first Skokholm ringed bird to be found in the Faroes since ringing recommenced in 2013. Although nearly 300 British ringed petrels have been controlled in the Faroes, this movement was particularly swift, with an average of over 125km being covered each day as it worked north.

Ringing recovery SE31257

Originally ringed as an adult, LE CONQUET, FINISTÈRE, FRANCE 21st June 2017

Recovered SOUTH HAVEN, SKOKHOLM 10th August 2017 (sic)

Distance travelled 375km at 355 degrees (N)

Days since ringed 50

This is the fifth individual ringed in this region of France to be found on Skokholm since 2013. The commune of Le Conquet is home to Banneg, the largest Storm Petrel colony in France, an island thought to be home to just under a thousand pairs which primarily nest in abandoned Rabbit burrows. Intriguingly this nesting habitat was not found to be in use on Skokholm during the 2016 whole Island census.

Fulmar *Fulmarus glacialis*

Aderyn-drycin y Graig

Fairly Common Breeder first bred in 1967

1 pullus trapped

1936-1976: 34 trapped, 2017: 3 pulli trapped

Following the return of staff on the 6th, there were over 100 birds ashore on ten March dates including highs of 149 on the 7th, 148 on the 23rd and 144 on the 29th; these arrivals contributed to daily maxima of 183 on the 7th and 207 on the 8th, although there were lows of five on the 14th, 12 on the 17th and nine, all at sea, on the 20th, whilst no birds were seen at all on the 18th and 19th. April saw regular departures from the cliffs, with lows of between 26 and 54 noted on nine dates (five dates in 2017) but three-figure counts logged on 11 (eight dates in 2017). Following a 2nd May total of 105, there was the usual prelaying exodus with 13 days when counts ranged between 69 (on the 3rd) and 17 (on the 7th). Numbers then increased, with 88 on the 16th, 96 on the 17th, 112 on the 18th, 124 on the 20th and 149 on the 22nd. The first egg was seen in North Gully on 19th May, the same date as the first of last year, one day later than the first of 2016 and two days earlier than the first of 2015; the first egg of 2014, following prolonged and severe winter storms, was on the 28th.

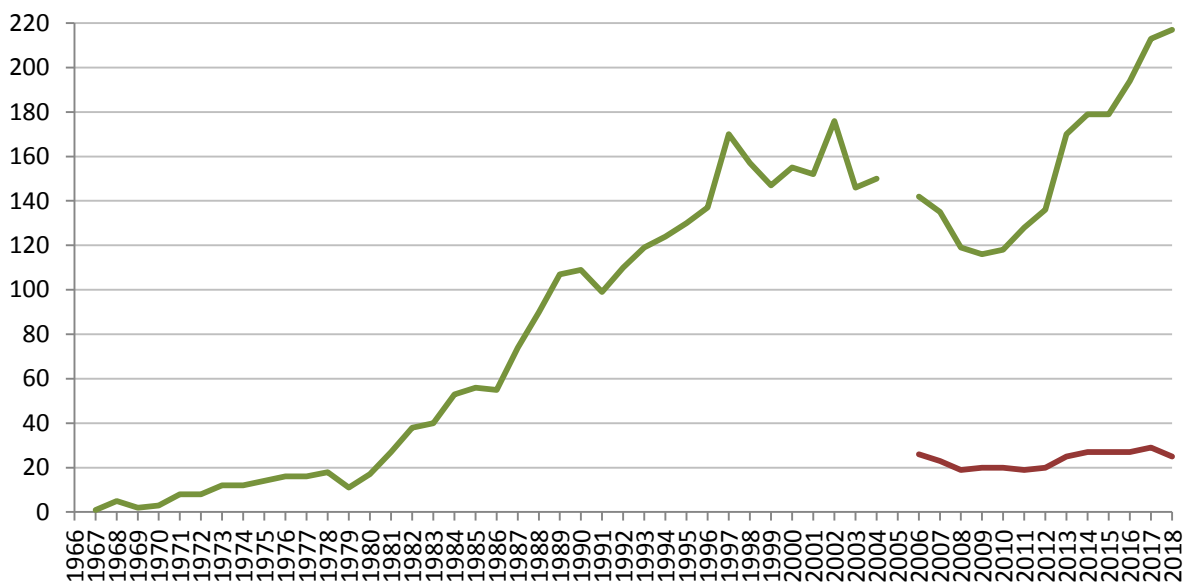
The whole Island totals (apparently incubating adults), mean plot totals, the range of totals over ten study plot visits, the standard deviation observed over the ten visits since 2013 and the percentage of the Island total made up of study plot birds. (*includes a boat-based count)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Island	116	118	128*	136	170*	179*	179*	194*	213*	217*
Plots	20	20	19	20	25	27	27	27	29	25
Range	(16-27)	(17-24)	(16-22)	(16-25)	(22-28)	(23-29)	(26-29)	(25-29)	(26-31)	(23-27)
±SD					2.07	1.79	1.14	1.26	2.00	1.26
Plot %	17.2	17.0	14.8	14.7	14.7	15.1	15.1	13.9	13.6	11.5

The six study plots counted annually since 2006 were visited on ten dates between the 2nd and 11th June. Up until the 2017 season only three of these plots had contained Fulmars, however an apparently incubating bird occupied a niche in the top third of the North Gully auk colony for five dates from 1st June last year; the only Fulmars logged this year were in the usual three plots (at Little

Bay, Middlerock and Guillemot Cliff). The mean of 25 apparently incubating birds was four down on the record total of last year and the lowest since 2013; this 13.8% decline in numbers was not spread evenly across the plots, indeed the Guillemot Cliff total remained at five for a fifth successive year and there was an extra pair at Middlerock, with six nest sites equalling the record set in 2016. The number of occupied sites at Little Bay has been steadily declining from a high of 19 in 2013; there were 18 in 2014, 17 in 2015, 16 in 2016 and 14 this year following an increase to 18 in 2017. Quite why there were four fewer is something of an unknown although, given the close proximity of the Little Bay nest ledges to each other, the intraspecific interactions noted in recent years may have had an effect. The number of apparently incubating adults logged was more consistent between visits, with a range of five being the second tightest spread to date, equal with that seen in 2016 and only one up on 2015.

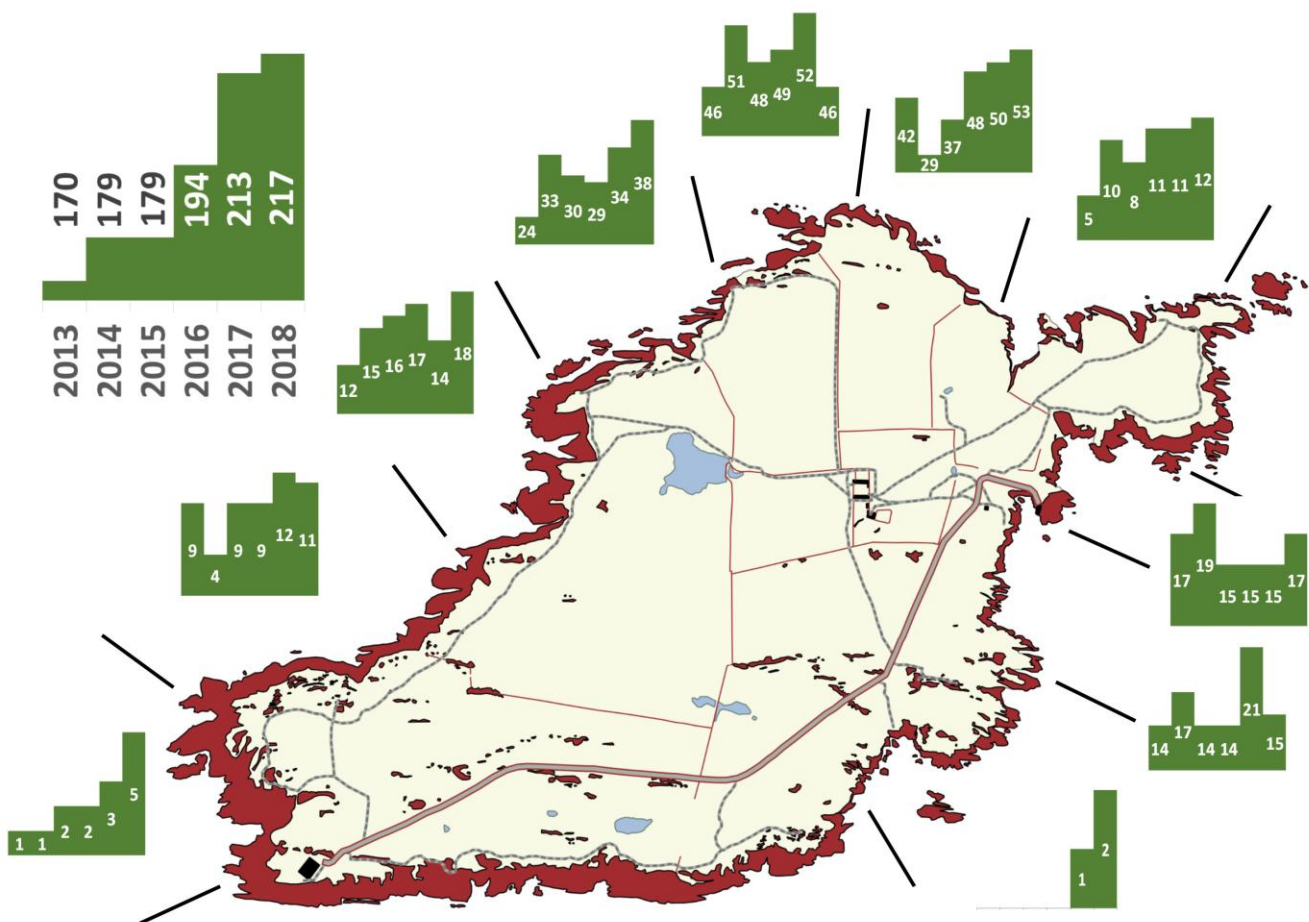
The total number of apparently incubating Fulmar recorded on Skokholm since breeding began in 1967 and the number within the study plots since 2006.



The whole Island count of apparently incubating adults (aia) undertaken between the 4th and 10th June yielded an average of 217aia, an increase of 1.9% on the 213 logged in 2017 and the highest total yet recorded on Skokholm. Despite this slight increase, there were notable declines in and around Hog Bay, where there were six fewer sites, and around the Little Bay study plot area mentioned above, where there were also six fewer sites overall. The only other decline was noted at the Bluffs where there was one less site. The largest increases were noted between Purple Cove and Twinlet and between the Jogs and the Dents, both areas seeing four extra sites this year, whilst three extra sites were mapped between Near and Far Bays and around Peter’s Bay. The more recently colonised southerly sections of Skokholm again saw an increase in the number of breeding Fulmar, with two new sites noted around the Quarry and a new site to the west of Crab Bay (an attempt which went on to fail).

The 2018 whole Island count again includes approximately 40 pairs which would be difficult or impossible to see from the Island itself (birds seen from a boat north of North Gully, north of Wreck Cove, on the Little Neck and in hidden crevices between Smiths Bay and Little Bay Point). The drop in numbers observed between 2006 and 2012 may perhaps thus be linked to a lack of boat access, although the study plots broadly mirrored the dip in the Island total. The proportion of the Island total made up of study plot birds dropped to 11.5% this year (from a high of 17.2% in 2009); this was the lowest recorded since the plots were begun and probably an indication that they are not, due to a lack of space for expansion, representative of the Island as a whole.

The distribution of apparently incubating Fulmar 2013-2018.



On 24th May 49 incubating adults were selected for productivity monitoring (eight at Twinlet, seven at North Gully, 19 around Little Bay Point, four at Rat Bay and 11 at Peter's Bay); birds seen with eggs or those apparently incubating for ten consecutive days from this date were included in the sample (thus more birds were initially monitored but were soon found not to be incubating). It was again found that eggs were easier to see following heavy rain as energetically preening adults were more likely to reveal their nest scrape. There were three early egg stage failures, after approximately eight, 16 and 18 days, the former of which was regularly left unincubated to the side of the adult present. A further 16 failures became apparent at the time that the eggs of neighbouring pairs were hatching, however the nest contents were not seen in 15 cases and it was thus not clear if the failures were at egg stage or small chick stage; one pair remained with an egg for the full incubation period, although the egg was regularly left unincubated by the adult present and failed to hatch. Four pairs failed with small chicks less than eight days old. One of these youngsters, which inadvertently fell from its natal ledge at Middlerock, survived for three days on a ledge below its presumed parents before perishing; only upon its death were both adults seen to attend the youngster, with one attempting to incubate it two days after its demise. Further chicks perished at minimums of 20 and 31 days of age; the former looked particularly weak before its death and both bodies remained on the cliffs for some days before being scavenged. Similar large chick failures were observed in 2014 and 2015 but not in 2016 or last year.

Of the 49 monitored breeding attempts, 24 (48.98%) were successful; a productivity estimate of 0.49 fledglings per pair is 8.9% up on the 0.45 of last year and 11.4% up on the post 1972 average of 0.44, but 14.0% down on the 0.57 logged in 2016. An above average productivity estimate, coupled with the observed increase in the whole Island population, leads to a predicted 106 Skokholm fledglings in 2018, a total only exceeded previously by the 111 predicted in 2016. Poor productivity at Peter's

Bay between 2013 and 2015 influenced the overall figure for those years; Peter’s Bay productivity in 2013 was 0.06 (compared with an overall figure of 0.34), in 2014 it was 0.33 (compared with 0.53 overall) and in 2015 it was 0.18 (compared with 0.47 overall), however the 2016 season saw 0.54 fledglings per pair (virtually identical to the overall value of 0.57). Last year again saw below average productivity at Peter’s Bay, with 0.31 fledglings per pair (compared with 0.45 overall) and this year also followed the trend, with productivity at Peter’s Bay of 0.36 fledglings per pair. The reason for this near annual discrepancy is still unclear, with neither environmental factors, predation pressure nor the behaviour of the birds themselves being obviously different at this site.

Fulmar productivity (total number of fledged chicks per monitored pair) for each year that it has been calculated between 1972 and 2018. The 1972-2018 mean is 0.44 ±se 0.02 fledglings per pair.



It is likely that the continuing increase in Fulmar numbers will affect other species; recent years have seen both adult and young Herring Gulls oiled by nesting Fulmars, Razorbill adults and chicks evicted from ledges by prospecting birds and an oiled juvenile Peregrine. More intraspecific interactions were noted last season, with a heavily oiled adult at Little Bay and birds at both Middlerock and North Gully oiled by aggressive neighbours; in both the latter cases the egg was lost early in the breeding season (prior to the whole Island census). Although no interspecific or intraspecific

aggressions were witnessed this year, a small number of adult Fulmar seen sat on gull nests suggested that there was ongoing competition for isolated nest ledges (above photograph).

The first fledgling of the year left its natal ledge in Peter's Bay on 21st August, one day earlier than the first two of 2017 and the first single of 2016 (the first departures were on 20th August in 2015, 23rd August in 2014 and 25th August in 2013). All of the study chicks departed over the following 14 days (two more days than last year but five fewer than in 2016), with 20.8% having fledged by 24th August (38.5% last year), 50.0% by 29th August (also 50.0% last year), 83.3% by 1st September (80.8% last year) and 95.8% by 2nd September (96.2% last year). The last study chick fledged on 4th September, one day later than the last of 2017 but four days earlier than the last of 2016 and six days earlier than the last of 2015. The number of birds around the cliffs again dropped rapidly as the fledglings departed, although there were offshore rafts containing 72 birds on the 4th and 74 birds on 5th September which contributed to daycounts of 138 and 137 respectively. Daycounts dropped to 41 on the 8th, 35 on the 9th and 23 on the 13th when the last bird was seen ashore (6th September last year). Following a count of 14 at sea on the 21st, 11.5 hours of seawatching effort between the 22nd and 28th produced only singles on the 23rd, 24th and 28th. Despite considerable seawatching effort, the only October records were of a single off Warden's Rest on the 21st and four close in on the 31st. There were November records on all but six dates prior to the departure of staff on the 26th, including highs of 108 in Broad Sound on the 3rd, 100 on the 13th and 173 on the 14th. A single was back on the cliffs on 6th November, the same date as the first 33 returned ashore in 2017, four days before the first five of 2016 and five days before the first single of 2015. There were birds ashore on ten further dates to the 16th, including a peak of 52 on the 13th when birds occupied ledges at Little, Near and Far Bays, the Jogs and Twinlet.

Manx Shearwater *Puffinus puffinus*

Aderyn Drycin Manaw

Very Abundant Breeder a 2012-2013 census estimated approximately 63980 pairs (46184 in 1998) 2174 trapped (including 114 pulli), 714 retrapped, 6 controls
1936-1976: 169,895 trapped, 2011-2017: 8058 trapped, 3345 retrapped, 16 controls

Multiple birds calling in the early hours of 14th March were seven nights earlier than the first to be heard last year, 12 earlier than the first of 2016 and the earliest since one on the same date in 2013. Three watched at sea off the Lighthouse the following evening was the earliest at sea sighting for over 15 years. The first two to be eaten by Great Black-backed Gulls were noted on the 24th, from when birds were obvious each night. Numbers increased quickly but, as in the previous three years, seawatching during April produced some surprisingly small counts, with highs of just 4400 on the 24th and 3730 the following day. A count of 28200, made during a southwesterly gale on the 1st, was the highest May daytotal of the last six years; there were further May highs, made during calmer conditions, of 25200 on the 2nd, 12800 on the 29th and 31st and 12500 on the 30th. The maximum June daycount was the lowest of the last six years, with 2800 on the 20th being well down on the peak of 16000 logged last year. Calm conditions at the start of July saw the two largest daycounts of the year, with 44568 on the 1st and 45016 on the 3rd, the latter of which was the highest July count and the second highest daycount of the last six years. There were five further five-figure counts during the month, including highs of 28040 on the 27th and 35560 on the 28th, only two of which were made during strong winds. There were seven five-figure August daycounts, four fewer than last year, with highs of 16956 on the 11th, 19847 on the 17th and 20524 on the 19th logged during periods of moderate or strong, south or southwesterly winds.

Three areas of study burrows, that is to say natural burrows where a paving slab covers a manmade access point to the nest chamber, were established in 2012 and 2013; all birds encountered within the burrows are ringed. Of 309 breeding adults bearing rings in 2017, 236 were found this year (76.38%). This figure is not an accurate estimate of adult survival as there was no searching for marked birds in neighbouring, non-study burrows; the number of birds known to be alive will thus

be revised upwards as they are discovered in future years. For example 82.27% of 2013 adults were encountered in 2014, but we now know that at least 88.65% of birds were alive (see below table). There is a large discrepancy in return rates depending on the breeding success of the previous year; of 252 birds successful with their 2017 breeding attempt, 202 were found in 2018 (80.16%), whereas only 33 of 57 unsuccessful birds returned (57.89%). Of 84 birds which went missing in 2018, 33 (39.29%) had either failed with their 2017 breeding attempt or had been found without an egg in a burrow in which they had previously bred. It could thus be concluded that some of the missing birds have not perished, but rather opted for more suitable nesting sites. It was noted last year that Storm Ophelia had caused considerable damage to the Lighthouse Study Plot, a destruction of burrows which no doubt led, at least in part, to the reduced number of recaptures in 2018. Ultimately the study burrows give a better insight into burrow fidelity and show an interesting correlation with the stability of the colony; in the fragile Lighthouse colony 30 of 107 marked birds were in the same burrow this year as that in which they bred in 2013 (28.0%), whereas in the more stable Crab Bay colony 32 of 55 birds were still in their 2013 burrows (58.2%). The fragile nature of the Lighthouse colony, along with the high density of burrowing birds and occasional storm events, sees the structure of the breeding tunnels change annually; clearly some lose their suitability as nest sites.

The number of Manx Shearwaters breeding in the study plots encountered the following year and the number to have been found by 2018.

	Birds found the next year		Birds found by 2018	
Birds breeding in 2017	236 of 309	76.38%		
Birds breeding in 2016	238 of 287	82.93%	261 of 287	90.94%
Birds breeding in 2015	230 of 283	81.27%	244 of 283	86.22%
Birds breeding in 2014	215 of 278	77.34%	236 of 278	84.89%
Birds breeding in 2013	116 of 141	82.27%	125 of 141	88.65%



A Manx Shearwater ringing transect was established in 2013. It was defined as the track between the Observatory and the Lighthouse and the length of a landing net to either side; ringers were not to deviate from the track. The aim was to see whether, by ringing birds on the surface in this defined area, the retrap data could be interpreted to provide large sample size estimates of adult survival and the recruitment of juveniles to the breeding population. This is still a project in its infancy which is producing a substantial amount of data, data which is currently impossible to examine in any detail as the British Trust for Ornithology changes its recording system from IPMR to DemOn. Of the

4719 adult birds ringed along the transect between 2013 and 2018, 1460 have been retrapped or found dead on Skokholm subsequently (with these recaptured individuals accounting for 2559 separate handlings); the breakdown of how many ringed in each year have been found in subsequent years is not currently available. Last year it was noted how the proportion of birds retrapped increases with cohorts ringed longer ago, for example 291 (33.26%) of 875 adults ringed in 2013 had been found in later years, including 12 seen during 2017 but in no other year. There were almost certainly some first-time recaptures during 2018 which would increase this proportion still further. There have also been 2576 fledglings ringed along the transect between 2013 and 2018.

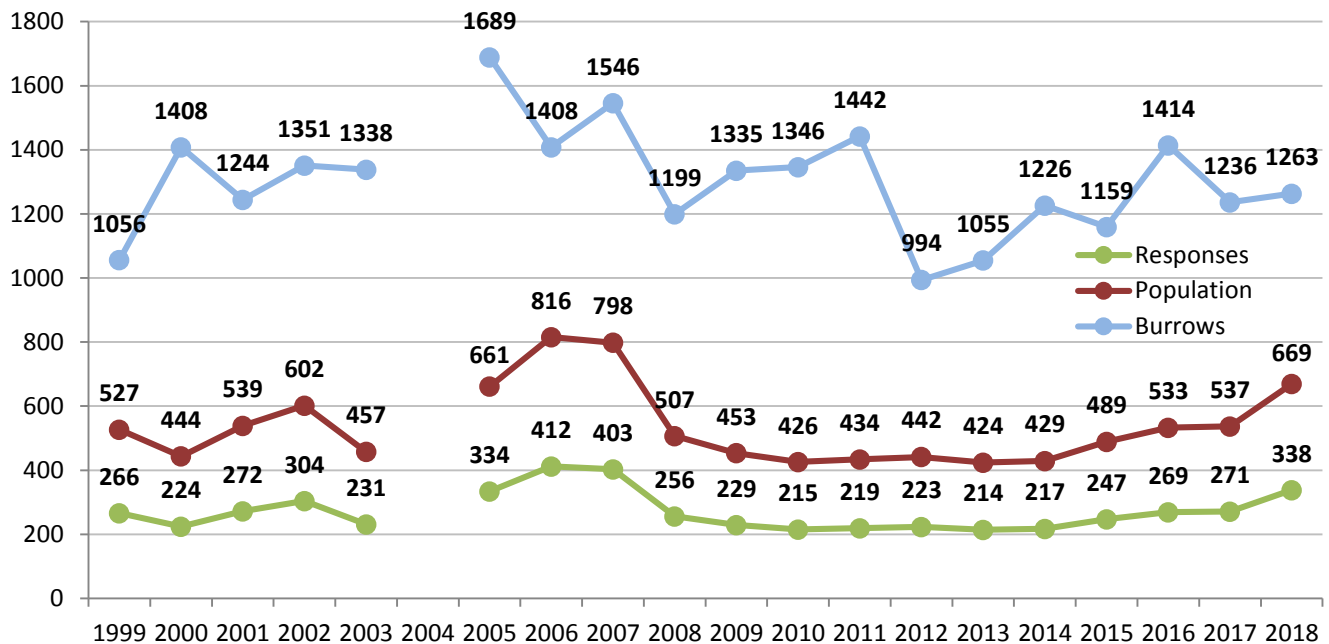


The study burrows facilitate an accurate assessment of breeding success on Skokholm. There were 125 burrows at the Lighthouse occupied by a pair which produced an egg, seven burrows contained an egg along the Quarry Track and 24 pairs produced an egg inland of Crab Bay. There were thus 156 burrows this year from which productivity could be assessed (159 in 2017). Of these 30 definitely failed at egg stage and 11 failed at egg or very small chick stage (but neither eggs nor dead chicks were found). Five pairs failed with chicks which were yet to put on any significant primary growth, only two of which were found dead, and the chick of one pair went missing with a wing of at least 114mm. For a chick to be assumed to be of fledging size it was required to reach a wing length in excess of 200mm (although not ready to fledge, we have shown that chicks larger than this size may swap to a different burrow and therefore go undetected). There were 109 chicks which reached this size in 2018. Productivity was thus 0.70 fledging-sized chicks per breeding pair (69.87% of pairs produced a fledging-sized chick). This is 12.5% down on a remarkable 0.80 logged last year, but only 1.4% down on the 2013-2017 mean of $0.71 \pm se 0.02$. It should be noted that this is the number of chicks which attained fledging size and does not reflect the number of fledglings which are lost to Great Black-backed Gull (and to a lesser extent corvid) predation as they exercise their flight muscles and make their first flights. Having said that, none of the 114 fledglings ringed in the study plots were found predated this year (two of 135 were found eaten last year).

In 1999 nine study areas, each a circle of 1000 square metres, were established to allow a reasonable subset of the Skokholm Manx Shearwater population to be monitored from year to year.

Two of these plots were discontinued, one in 2006 and one in 2007, as the survey work was disturbing the Lesser Black-backed Gull colonies. New plots were established in 2006 and 2015 to maintain a good sample area, however only seven plots have been sampled for a full 19 years. On each annual visit the number of burrows within the area is counted, along with the number of burrows from which a response is elicited when the call of a male bird is played down them. The standard correction factor (1.98) is then used to estimate the population within the area (see the 2013 and 2014 Seabird Reports for checking of the correction factor).

The total number of burrows, responses and the corrected population estimate for the 7000 square metres sampled annually since 1999.

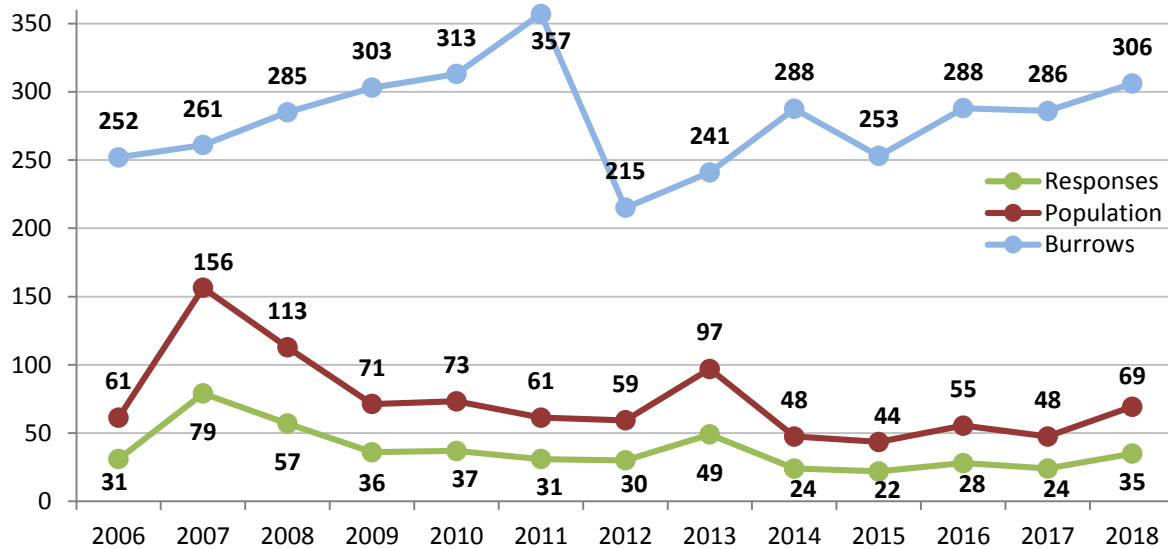


The drop from 2007 numbers was previously attributed to the collapse of many burrows in the more fragile areas of Skokholm, particularly near the Lighthouse which was at one time the densest area of breeding Manx Shearwaters on the Planet (Smith *et al.*, 2001). Although this may certainly have played a role, it seems unlikely that it would be a major factor as there are considerably more burrows than pairs and the number of burrows appears to fluctuate independently of the number of tape playback responses. The eighth sample plot, begun in 2006, shows nicely the apparent lack of connectivity between the number of burrows and the apparent number of breeding pairs (see graph below); a 39.8% decline in the number of burrows between 2011 and 2012 coincided with virtually no change in the number of apparently occupied burrows, whereas a 154.8% increase in the number of responses between 2006 and 2007 coincided with an increase of just nine burrows. These discrepancies may be attributable to the number of burrows frequently being altered by Rabbits, the weather, in some areas by Puffins and perhaps most markedly in some places, the digging of non-breeding Manx Shearwaters.

The overall number of responses across 8000 square metres was the highest since 2007, 26.2% up on last year and 23.6% up on the 2006-2017 mean (597.25 ±sd 154.00). This was the result of a drop of between three and seven responses in four plots (the largest decline being near Spy Rock) and an increase of between nine and 67 at four plots (the largest increase coming at Quarry Track Rise). It would appear that the Skokholm breeding population can still be cautiously regarded as stable, although the observed variance in the percentage of birds which respond to the playback on any given day highlights both the degree of error in these numbers and the importance of continued monitoring (see Brown and Eagle, 2013 and 2014). That the number of pairs producing eggs in the study burrows is also stable lends support to this theory. Further evidence for a stable population

comes from the adult ringing programme, with a steady recapture rate of between 84.89% and 90.94% logged between 2013 and 2017 (see above).

The total number of burrows, responses and the corrected population estimate for the 1000 square metre plot sampled annually since 2006.



The estimated number of pairs in the 8000 square metres sampled since 2006.

2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
869	954	620	525	499	495	501	521	477	533	588	585	738

As part of Seabirds Count, the fourth census of all breeding seabirds in Britain, a whole Island Manx Shearwater survey was conducted by the Wildlife Trust of South and West Wales with support from the Seabird Group and Natural Resources Wales. The methodology was much the same as that used during the 2012-2013 census, although a dual-sex recording was used to elicit responses as it has been shown that this both increases the response rate and reduces daily variability in the response rate (Perkins *et al.*, 2017). A team of nine, namely Alys Perry, Amy Sherwin, Eleanor Absalom, Giselle Eagle, Kirsty Franklin, Michelle Underwood, Richard Brown, Stephen Vickers and Zoe Deakin elicited 2431 responses from 7564 burrows between the 2nd and 9th June. The response rate to the dual-sex recording was checked at 50 study burrows on ten dates between the 2nd and 19th June when responses were elicited at approximately 72% of active sites, well up on the 49% typically achieved using the male-only recording. Playback at study burrows which did not contain a nest attempt elicited a response on an average 24% of occasions, owing to the presence of non-breeding birds. The whole Island estimate, based on an assessment of suitable breeding habitat and the number of active burrows sampled within each hectare, will be approximately 88945 pairs, although with confidence intervals of nearly 22000. The 2012-2013 whole Island census predicted a total of 63980 breeding pairs, with a standard error of 8134 and 95% confidence limits putting the actual total somewhere between 48037 and 79923 pairs (Perrins, *pers. comm.*). Even the lowest extreme of the 2012-2013 census was up on the 1998 estimate of 46184, although different methodologies were used for each survey. Despite considerable footfall away from the path network, only 35 burrows were damaged and repaired during the census; fortuitously, no eggs or birds were harmed. A full report on the 2018 survey will be produced in due course.

In the period between 1957 and 1997 the number of dead Manx Shearwaters located on Skokholm was recorded in the daily census log. The corpses were either stored or thrown into the sea to ensure that birds were not counted more than once. The practice was stopped in 1997 as it was felt that the removal of the corpses would be impacting the specialist community of species evolved to

exploit this food source. However, with a Great Black-backed Gull population more than twice the size it was when the counting was stopped, the study was begun again in 2014. To limit the impact on the scavenging community, the birds were left in situ but their wings were painted with stock marker so that they were not double counted. This year, as in the previous three, corpses were marked by neatly slicing the flight feathers of both wings with a pair of scissors (using scissors has the added advantage that it makes it easier to check for rings on tightly inverted corpses). Although the vast majority of Manx Shearwater kills are made by Great Black-backed Gulls, a Raven was watched as it extracted a shearwater from its burrow and killed it on 2nd April and a corpse found at the base of the Lighthouse following thick fog on the night of 17th April was probably a collision victim (it had been ringed as a juvenile in 2015); further birds had been heard to strike the Lantern and the Cottage roof that night.

The number of Manx Shearwater corpses found between 1957 and 1983 from Gynn (1984) plus data from 1984 to 1991 and 2014 to 2018. The number of Great Black-backed Gull breeding pairs is also included for each year.

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Corpses	2465	1886	924	1354	1089	640	688	1059	857	946
GBBGU	27	30	30	10	12	5	7	12	8	10
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976
Corpses	816	841	829	304	606	1350	1082	869	1051	1266
GBBGU	10	3	14	11	16	12	12	7	7	7
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Corpses	1913	1820	1153	1024	1080	1479	1373	1316	1571	1068
GBBGU	6	10	10	10	11	16	11	14	11	10
	1987	1988	1989	1990	1991	2014	2015	2016	2017	2018
Corpses	1759	1760	1694	1915	2703	4271	4123	3782	3449	3270
GBBGU	11	12	15	16	20	84	83	93	93	93



As might be expected with a larger Great Black-backed Gull breeding population, the number of corpses marked over the last five years has been the most ever. However the average number of corpses per Great Black-backed Gull pair has been lower than in all years except 1959, 1970 and

1971. One possible explanation for this reduction in kills per pair is that the breeding gulls were routinely disturbed between 1949 and 1985 which, while reducing the number of breeding pairs, probably inflated the non-breeding flock which would still be taking shearwaters. The data collected over just the last five years suggests that, despite the record equalling number of breeding Great Black-backed Gulls, the number of Manx Shearwaters being eaten is declining (see below table). Although the number of adult corpses located over the last three years has been relatively consistent, the 2018 adult total was 24% down on that of 2013; this is ostensibly good news, however a substantial decline could actually be cause for concern. It is often suggested that the majority of predated shearwaters are younger, less experienced birds, those which spend longer on the surface as they prospect for burrows and mates; a reduction in corpses may thus reflect a reduction in the abundance of these more vulnerable birds, a decline which would perhaps not be obvious during the playback and study burrow surveys but which could have a substantial effect on the future growth of the population. However the 54 ringed adults found eaten this year do little to support this theory (see below table); although several more years of ringing data would be helpful and there is no information on the breeding status of those eaten (so they could perhaps still have been unpaired or burrowless birds spending longer on the surface), there is no evidence that the birds being eaten are younger. Other factors which may impact predation rates are vegetation heights, the number of gulls specialising in shearwaters (Westerberg *et al.*, 2018), the complexities of the weather and moon cycle and the size of the Rabbit population (Rabbits being the other main prey item on Skokholm). The prevalence of puffinosis may affect juvenile losses (see below).

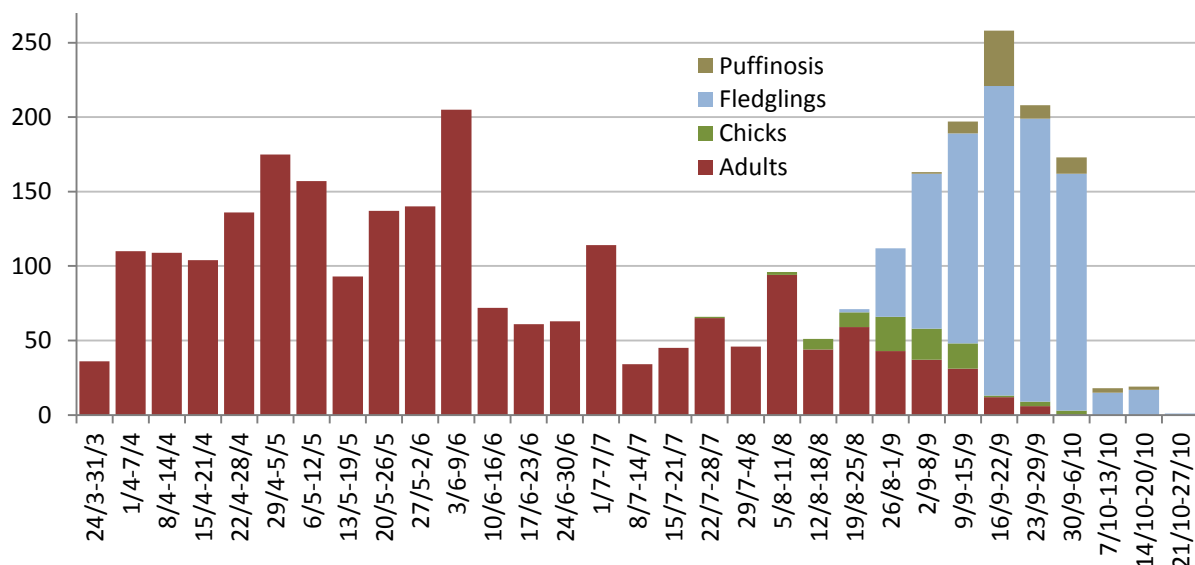
The number of adult and juvenile Manx Shearwater corpses found each year, along with the number of untouched puffinosis bodies.

	2014	2015	2016	2017	2018
Adults	2931	2702	2299	2071	2228
Juveniles	1287	1324	1398	1289	971
Puffinosis	53	97	85	89	71
Total	4271	4123	3782	3449	3270

When the 54 marked adults found eaten in 2018 were ringed. Note that the four pre-2013 birds were controls ringed elsewhere and that intensive ringing on Skokholm recommenced in 2013.

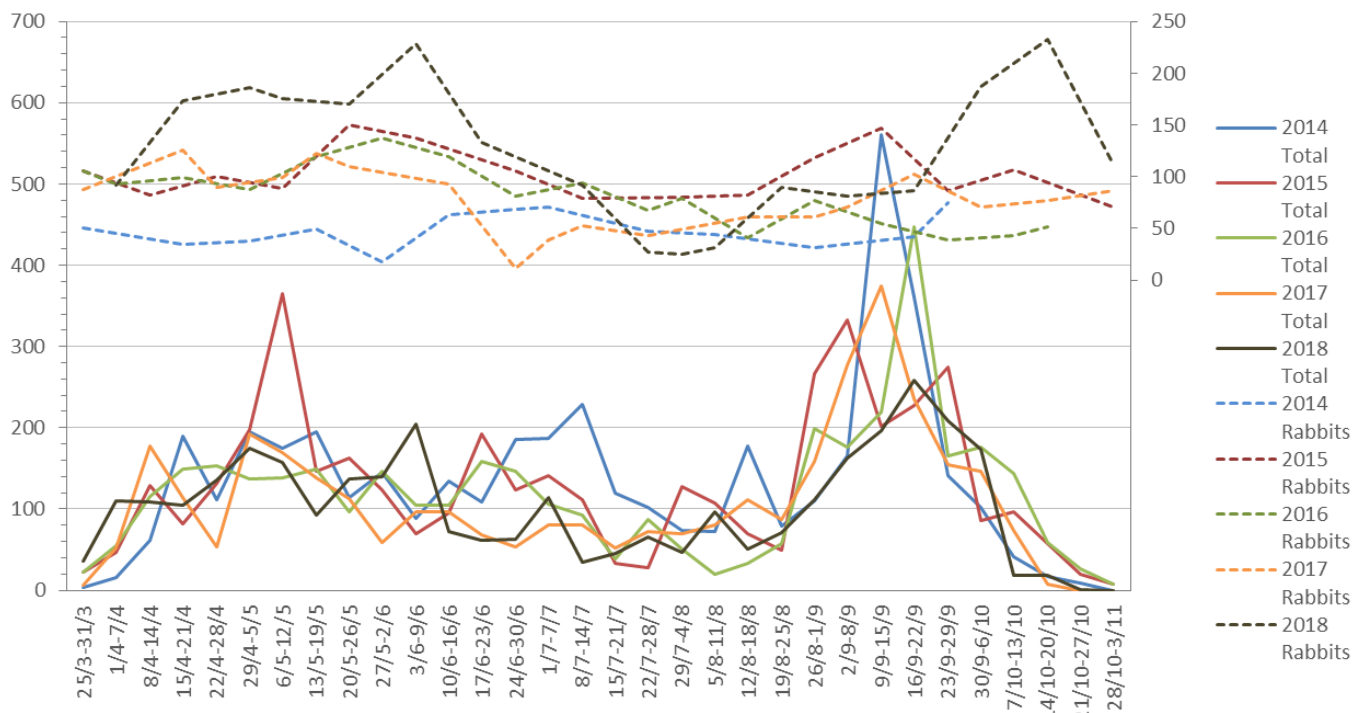
Chick	Adult	Adult	Adult	Adult	Chick	Adult	Adult	Chick	Adult	Chick	Adult	Adult
1984	1991	2001	2011	2013	2013	2014	2015	2015	2016	2016	2017	2018
1	1	1	1	10	2	10	11	1	11	2	2	1

The number of corpses found during each week from 24th March until 22nd October.



The data from the last five years lends some support to the theory that Rabbit numbers influence Manx Shearwater predation, with the North Plain Rabbit population being considerably lower in 2014 when adult shearwater mortality was at its highest. Likewise the increase in the Rabbit population witnessed this autumn may have resulted in the 24.7% drop in the number of juveniles found eaten this year. One potential issue with this comparison is that North Plain Rabbit counts are probably not representative of the Island as a whole, with the effects of Viral Haemorrhagic Disease seemingly differing in different parts of the Island at different times. The Rabbit population has been considerably lower than average during the five years of this carcass marking study; for example in 2013 the highest plot count was 463 on 22nd May, this compared with a count of 233 in October 2018 which was the highest count of the last five years. A return to 2013 Rabbit numbers would provide ideal conditions for monitoring their influence on shearwater predation

The total number of Manx Shearwater carcasses found each week 2014-2018 and the number of Rabbits counted in the North Plain census plot during the same period.



The first fledglings were encountered on the evening of 27th August, six days later than the first of 2017 and 2015, four days later than in 2016 and 2013 and two later than in 2014. The first fledglings showing signs of puffinosis were found on the night of 1st September; these were eight days later than the first of last year. Puffinosis is a mysterious affliction which, possibly due to the actions of a virus which leads to bacterial infection, sees the development of conjunctivitis, blistered feet and problems with limb control; it is often fatal. The number of puffinosised birds found dead has been relatively consistent over the last five years, with between 53 and 97 corpses attributed to the disease (71 this season). However considerably more infected birds are seen than found dead; unlike predated birds, which are usually taken to open areas, puffinosised birds may die deep in the Bracken and go undetected. In an attempt to achieve a better understanding of how puffinosised birds are distributed across Skokholm during the course of the autumn and of how the number of infected individuals changes from year to year, a transect walked by Island staff over eight September nights was established in 2015 (the 2015 report gives details of the route). The position of each fledgling is recorded using a GPS unit before they are inspected for signs of puffinosis.

The number of Manx Shearwater fledglings located along the transect is likely to be different between years, not just because of fluctuations in productivity, but more critically due to differences

in the weather and moon cycle which influence their surface behaviour. In total over the eight visits there were 500 more fledglings encountered this year than in 2017, with a total of 1008 being the most yet recorded. Although the number of apparently infected birds was fractionally up on last year (88 compared to 78), the proportion of birds showing signs was considerably down on the previous three years, with a mean of 8.7% infected birds compared with 15.4% in 2017, 13.5% in 2016 and 29.1% in 2015. As in previous years, puffinosised birds were primarily distributed in the wetter areas of Skokholm, away from more exposed aspects which also typically lack Bracken (see below maps). Given that there is seemingly a link between wet areas and diseased birds, one possible explanation for the substantial decline in the proportion of puffinosised individuals was that 2018 proved an exceptionally dry year. That a significant drop in the proportion of infected birds came in the same year as a significant drop in the overall number of predated juveniles is intriguing (see above); it is quite probable that puffinosised birds are easier for Great Black-backed Gulls to catch, potentially leading to higher mortality in high puffinosis years (it would usually be difficult to tell that an eaten bird had been suffering from disease). However the number of juvenile corpses located in 2015, the worst puffinosis year of this four year study, was not significantly higher than in 2016 and 2017 when the proportion of puffinosised birds was lower.

The number of fledgling Manx Shearwaters encountered along the transect between 2018 and 2015, the number which showed signs of puffinosis and the proportion of encountered birds made up of those showing signs.

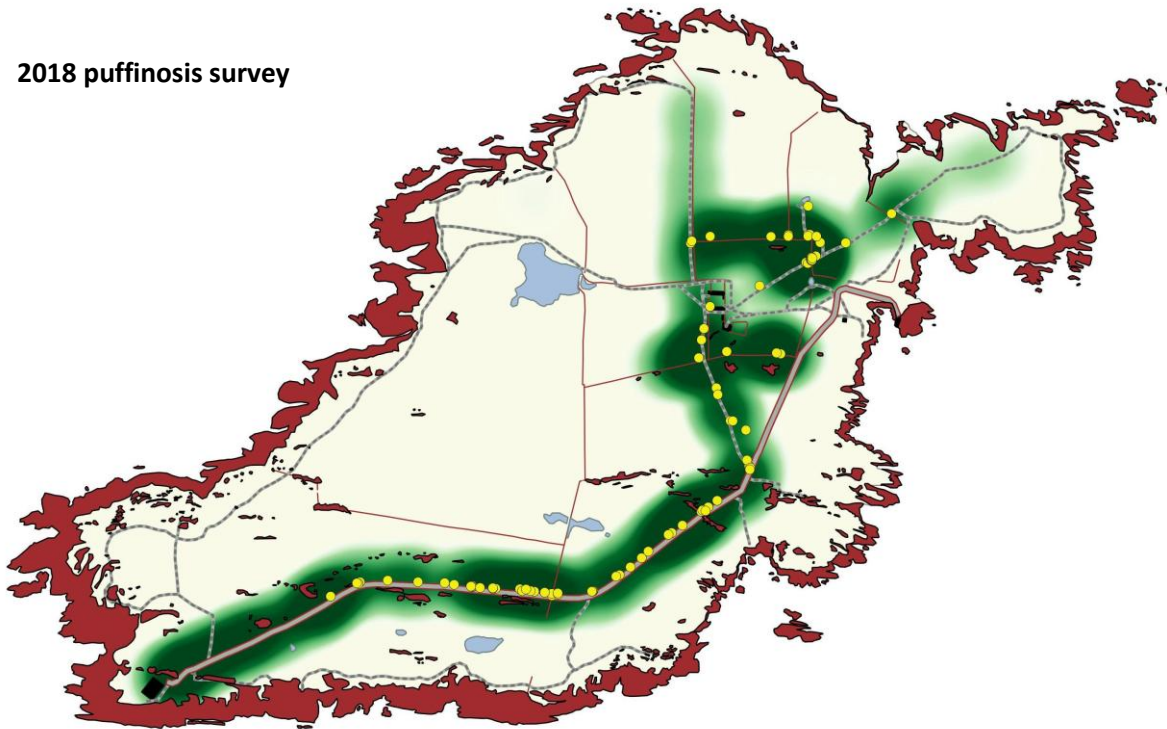
2018	1st-2nd	4th-5th	7th-8th	9th-10th	12th-13th	15th-16th	18th-19th	21st-22nd	Total
Birds	72	142	139	197	155	167	88	48	1008
Puffinosised	2	3	11	16	23	21	10	2	88
% Puffinosised	2.8	2.1	7.9	8.1	14.8	12.6	11.4	4.2	8.7
2017	1st-2nd	4th-5th	8th-9th	11th-12th	14th-15th	17th-18th	20th-21st	23rd-24th	
Birds	44	77	100	115	66	43	42	21	508
Puffinosised	4	13	16	10	4	16	14	1	78
% Puffinosised	9.1	16.9	16.0	8.7	6.1	37.2	33.3	4.8	15.4
2016	2nd-3rd	5th-6th	8th-9th	11th-12th	14th-15th	17th-18th	20th-21st	23rd-24th	
Birds	110	194	159	88	42	33	43	51	720
Puffinosised	20	18	22	13	8	5	5	6	97
% Puffinosised	18.2	9.3	13.8	14.8	19.1	15.2	11.6	11.8	13.5
2015	1st-2nd	4th-5th	7th-8th	10th-11th	13th-14th	16th-17th	19th-20th	21st-22nd	
Birds	54	164	219	155	162	101	58	41	954
Puffinosised	3	29	63	31	55	55	32	10	278
% Puffinosised	5.6	17.7	28.8	20.0	34.0	54.5	55.2	24.4	29.1

Survey work on 11th September revealed that 56% of youngsters had departed their study burrows. Of 1498 fledglings ringed this year, two disorientated individuals were found on the mainland, with birds at Newgale on the 19th and Angle on 21st September released back to sea unharmed. The last adult bird to be encountered along the study transect was trapped on 22nd September, two days after the last of 2017 but four days earlier than the last of 2016. September seawatch counts were well up on the previous five years, with highs of 20115 on the 8th (when a minimum of 18000 were in Broad Sound), 2143 on the 9th and 7840 on the 17th; recent September maxima have been 2260 in 2017, 732 in 2016 and 9523 in 2014. Counts dropped dramatically towards the end of September, with 85 on the 24th, one in a three hour watch on the 25th and no more than 27 each day until the end of the month. The only seawatching records in October were of singles on the 8th and 10th and nine west off the Lighthouse on the evening of the 26th, whilst the only signs of a continued presence after the 10th were freshly eaten fledglings on the 17th, 20th and 22nd and one calling after dark on the 31st. A late fledgling was sat on a hummock near the Lighthouse on 1st November, a bird was calling near the Lighthouse later the same night, seven on the 3rd included six in Broad Sound and one off the Lighthouse, one was off the Lighthouse on the 4th and one calling after dark on the 5th

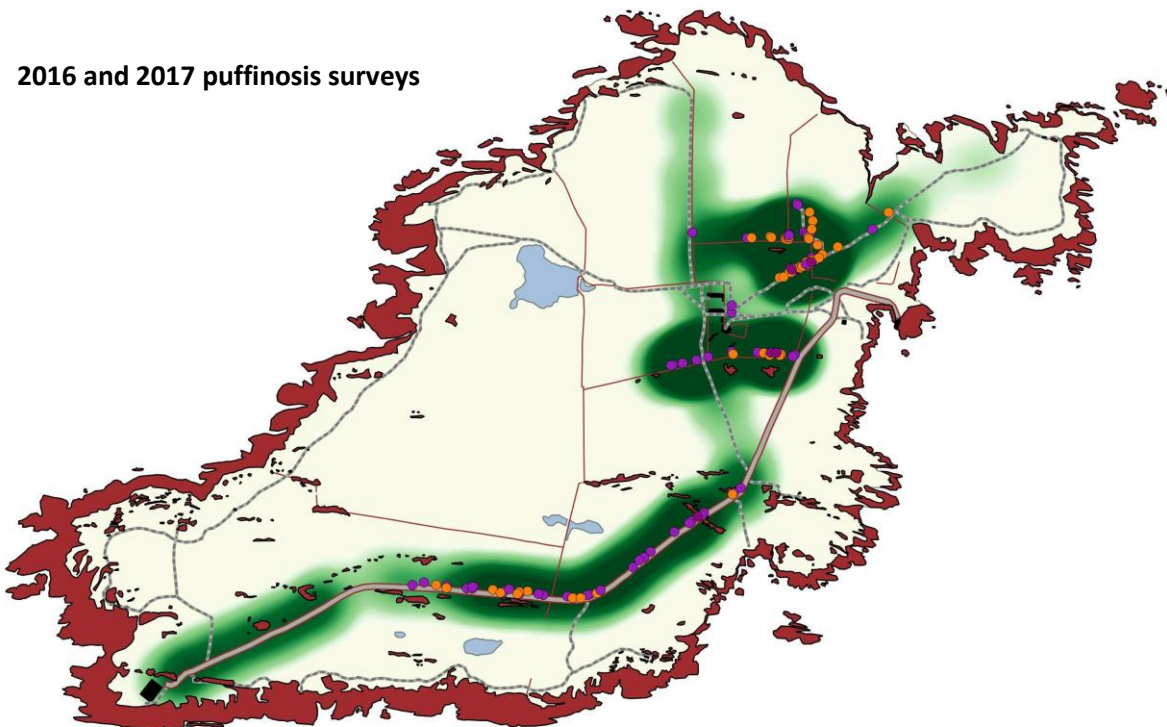
was the last record of the year; there have only been November records in nine years since 1927, including four of the last five.

The 2018 and 2016-2017 puffinosis surveys. Manx Shearwater fledgling density is shown in green, with the darker areas holding more birds. Each puffinosis bird encountered over the eight visits is marked by a circle, yellow in 2018, orange in 2017 and purple in 2016.

2018 puffinosis survey



2016 and 2017 puffinosis surveys



Ringing recovery EA11076

Originally ringed as a juvenile, SKOKHOLM 4th September 2018

Recovered PROA AL MAR, PLAYA HERMOSA, URUGUAY 8th November 2018

Finding condition Dead on beach, over a week old

Distance travelled 10799km at 208 degrees (SSW)

Days since ringed 65

There have only been 22 previous recoveries of BTO ringed Manx Shearwaters in Uruguay.

Ringing recovery EA11496

Originally ringed as a juvenile, SKOKHOLM 9th September 2018

Recovered VALERO OIL REFINERY, ANGLE, PEMBROKESHIRE 21st September 2018

Finding condition Collected by ringer and released to sea

Distance travelled 19km at 96 degrees (E)

Days since ringed 12

Ringing recovery EA11648

Originally ringed as a juvenile, SKOKHOLM 13th September 2018

Recovered PWLL MARCH, NEWGALE, PEMBROKESHIRE 19th September 2018

Released GOODWICK HARBOUR, FISHGUARD, PEMBROKESHIRE 19th September 2018

Finding condition Collected by ringer and released to sea

Distance travelled 20km at 32 degrees (NNE)

Days since ringed 6

Two examples of how poor weather, coupled with disorientating lights, can lead to Manx Shearwaters arriving on the nearby mainland. Ringing has shown that birds helped back out to sea can go on to breed on Skokholm.

Ringing recovery EF98315

Originally ringed as a pullus, LUNDY ISLAND, DEVON 7th September 2007

Previously recovered MANX SHEARWATER TRANSECT, SKOKHOLM 18th August 2016

Recovered MANX SHEARWATER TRANSECT, SKOKHOLM 10th April 2018

Finding condition At colony but not necessarily breeding

Distance travelled 74km at 325 degrees (NW)

Days since ringed 3868

Ringing recovery EX74428 (now EZ86248)

Originally ringed as an adult, LUNDY ISLAND, DEVON 6th June 2013

Recovered MANX SHEARWATER TRANSECT, SKOKHOLM 19th May 2018

Finding condition At colony but not necessarily breeding

Distance travelled 74km at 325 degrees (NW)

Days since ringed 1808

Rats had officially been eradicated on Lundy by 2006 (although the last recorded activity was in February 2004). By 2013 the Manx Shearwater population there had increased by over 3000 pairs. Recoveries from this population are proving to be a more than annual event on Skokholm.

Ringing recovery EY41716

Originally ringed as an adult, CRAB BAY STUDY PLOT, SKOKHOLM 30th May 2013

Recovered RUSH, DUBLIN, IRELAND 8th July 2018

Finding condition Dead on beach, over a week old

Distance travelled 210km at 345 degrees (NNW)

Days since ringed 1865

Ringing recovery FB08349

Originally ringed as an adult, BARDSEY ISLAND, GWYNEDD 27th May 2001

Recovered SKOKHOLM 18th April 2018

Finding condition Dead, eaten by Great Black-backed Gull
Distance travelled 122km at 197 degrees (SSW)
Days since ringed 6170

Ringing recovery FB35217
Originally ringed as an adult, BARDSEY ISLAND, GWYNEDD 27th April 2011
Recovered SKOKHOLM 24th August 2018
Finding condition Dead, eaten by Great Black-backed Gull
Distance travelled 122km at 197 degrees (SSW)
Days since ringed 2676

Ringing recovery FR50832
Originally ringed as a pullus, SKOMER ISLAND, PEMBROKESHIRE 24th August 1984
Recovered MANX SHEARWATER TRANSECT, SKOKHOLM 14th May 2018
Finding condition Dead, eaten by Great Black-backed Gull
Distance travelled 5km at 149 degrees (SSE)
Days since ringed 12316

Ringing recovery FR97091
Originally ringed as an adult, SKOMER ISLAND, PEMBROKESHIRE 25th June 1991
Recovered SKOKHOLM 24th June 2018
Finding condition Dead, eaten by Great Black-backed Gull
Distance travelled 5km at 149 degrees (SSE)
Days since ringed 9861

Great Black-backed Gull *Larus marinus*
Fairly Common Breeder and Common Visitor

Gwylan Gefnddu Fwyaf

63 trapped (including 38 pulli), 4 retrapped
 1936-1976: 219 trapped, 2013-2017: 279 trapped, 8 retrapped, 4 controls

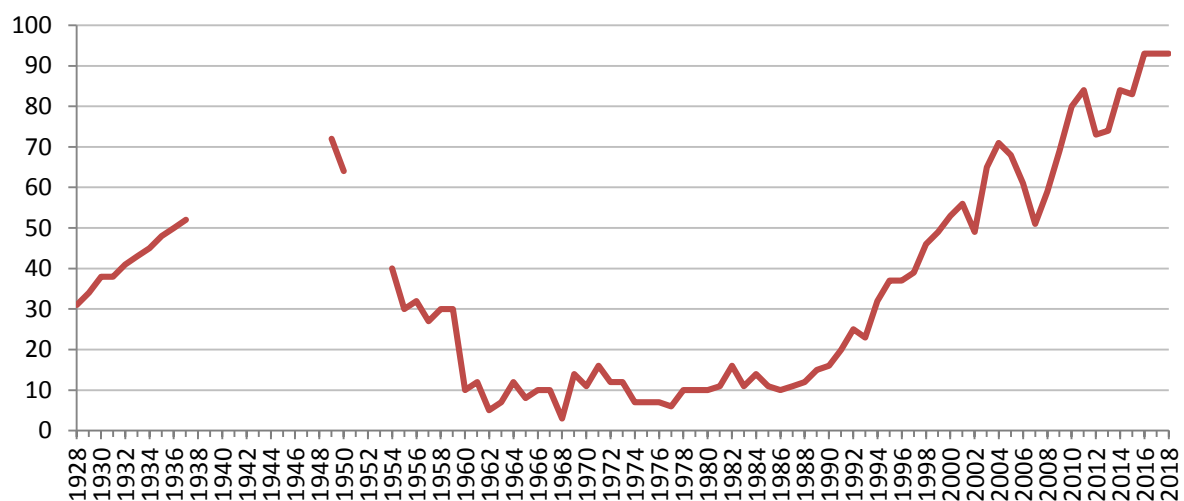
Although up to 121 were logged on each March date, the majority of birds were on territory, with maximum roost counts of only 35 on the 10th, 37 on the 23rd and 25 on the 27th (including up to six subadults); March roost counts peaked at 48 in 2017 and 2016, 37 in 2015 and 34 in 2014. Similarly there were up to 128 logged on each April date, with communal roosts of 50 on the 15th, 47 on the 18th and 35 on the 23rd; April roosts peaked at 58 in 2017 and 2016, 63 in 2015 and 54 in 2014. The sizable roost which formed at the Bog during the early part of the 2013 season, which peaked at 213 individuals on 3rd April, again failed to materialise. A whole Island census between the 6th and 18th May located 93 apparently incubating adults (89 accessible nests contained eggs); this was the same number as mapped in both 2017 and 2016, equalling the most yet recorded on Skokholm. It is not clear what has caused this apparent plateau in the population, although a drop in survival will have had an impact (see below). Given that some Welsh islands support considerably higher densities of Great Black-backed Gulls, notably the Gwylans, Gwynedd where there are no Rabbits and much lower seabird numbers, intraspecific interactions are perhaps not to blame (but see below).

The recent increase in the population was driven in part by high adult return rates; of 33 adults wearing colour rings in 2016, 32 returned to the same territories the following year (97.0%), whilst 19 of 21 returned in 2016 (90.5%) and 19 of 23 returned in 2015 (82.6%). Of 36 breeding adults with colour rings in 2017, 31 returned to breed this year (86.1%). As all of the adults present on Skokholm this breeding season were checked for rings, it seems likely that this is a good approximation of survival (although the sample size is still a little on the small side for a confident estimate). None of the colour ringed adults which have gone missing during the last four seasons have been rediscovered subsequently; it seems very likely that Skokholm Great Black-backed Gulls rarely, if

ever, take a year away from the colony or go unseen. That the 2018 return rate was the lowest of the last three years helps to explain why the population has plateaued; a return rate of 86.1% suggests that approximately 26 adults did not return for the 2018 breeding season, birds which must have been replaced by recruits to the population to maintain the 93 breeding pairs. At least one of these recruits had been metal ringed as a Skokholm chick in 2013 (it was found breeding on North Plain, the same area in which it had been ringed); given that chicks were first darvic ringed in 2014, it will be easier in future years to gain some estimate of recruitment (see below).

It is not clear what may have caused such seemingly high 2017-2018 adult mortality; whilst four unringed dead found on Skokholm following the 2016-2017 winter suggests that this may be a challenging season for them, three adults also perished during the 2018 breeding season (birds not included as missing this year as they returned to breed; they will be counted as missing for the 2019 survival estimate). Two of these dead adults were a colour ringed pair nesting north of Crab Bay which apparently died at approximately the same time; their outwardly undamaged bodies were both found within 50 metres of the nest site whilst their three well-grown chicks subsequently perished over several days. Although the reason for the demise of the adults was not established, one had suffered a broken leg during an aggressive encounter with a neighbouring pair two years previously. A third colour ringed adult was found washed up dead on Freshwater West, also in July; its nest was also close to Crab Bay. In August last year an adult arrived to the Lighthouse with a bloody leg which was missing its foot, the cause of which was probably entanglement in fishing gear. Great Black-backed Gulls were again regularly observed behind fishing vessels this year, although clearly some boats were more attractive than others; there were peak counts behind 'Boy's Pride' of 22 on 24th May and behind 'Our Hazel' of 17 on 28th August, 26 on 14th September and 23 on 25th September. An important step in understanding the Skokholm Great Black-backed Gull population will be to discover if such anthropogenic food sources are regularly exploited, particularly during periods of low seabird or Rabbit numbers when they may increase survival.

The number of Great Black-backed Gull breeding pairs 1928-2018 (where data exists). Control of numbers started in 1949 (destruction of both nests and adults) and stopped in 1985.



The Great Black-backed Gulls are spectacular apex predators and an exciting component of the Skokholm seabird assemblage, however it is important that we monitor the impact of these high breeding numbers on the Manx Shearwater population. Dead Manx Shearwaters were counted for a fifth consecutive year, the vast majority of which had been eaten by Great Black-backed Gulls (see the Manx Shearwater section for more details); a total of 3199 predominantly predated corpses, comprising 2228 adults and 971 youngsters, were marked this year (3360 comprising 2071 adults and 1289 young in 2017, 3697 comprising 2299 adults and 1398 young in 2016, 4026 comprising 2702 adults and 1324 young in 2015 and 4218 comprising 2931 adults and 1287 young in 2014). This

was thus the first year in four that the number of dead adult shearwaters has increased, with a 7.6% rise this year (following a 9.9% drop in 2017, a 14.9% drop in 2016 and a 7.8% drop in 2015), although the overall total was down for a fourth consecutive year due to a 24.7% drop in the number of 2018 young found predated. There are many factors influencing the number of corpses found; observer effort has been rather consistent, but possible or certain differences between years have included the number of Great Black-backed Gulls present (which may include differences in the number of Manx Shearwater specialists (Westerberg *et al.*, 2018)), the number of Manx Shearwaters available (which may include differences in the number of prospecting individuals likely to spend longer on the surface), the prevalence of suitable hunting conditions (governed primarily by the moon cycle and weather), the size of the Rabbit population (which may provide an alternative food source) and the prevalence of puffinosis (which may make young birds easier to catch). Although the number of dead birds currently being found represents a relatively small proportion of the Skokholm shearwater population, it seems likely that further growth in the Great Black-backed Gull population will impact the shearwaters. Ultimately more data is required to understand this relationship in greater detail.



A nest to the south of North Pond contained three eggs on 10th April, whilst 14 further nests were found to be empty; the first egg of 2017 was found on 18th April, the first two of 2016 were found on the 12th, the first two of 2015 on the 19th and the first of 2014 was also on the 10th. More unusual nest contents included a grey sock, a ketchup packet and an orange crayon, items which again suggested that at least some pairs are foraging around human waste (see Westerberg *et al.*, 2018). Of 25 monitored nests, seven pairs failed, five pairs fledged a singleton, nine pairs fledged two and four pairs fledged three. There were thus 35 fledglings and a productivity figure of 1.40 fledged young per monitored pair; productivity was 9.1% down on 2017 but 28.4% up on the 1989-2004 mean of 1.09 and 12.9% up on the 2008-2017 mean (1.24 ±se 0.13).

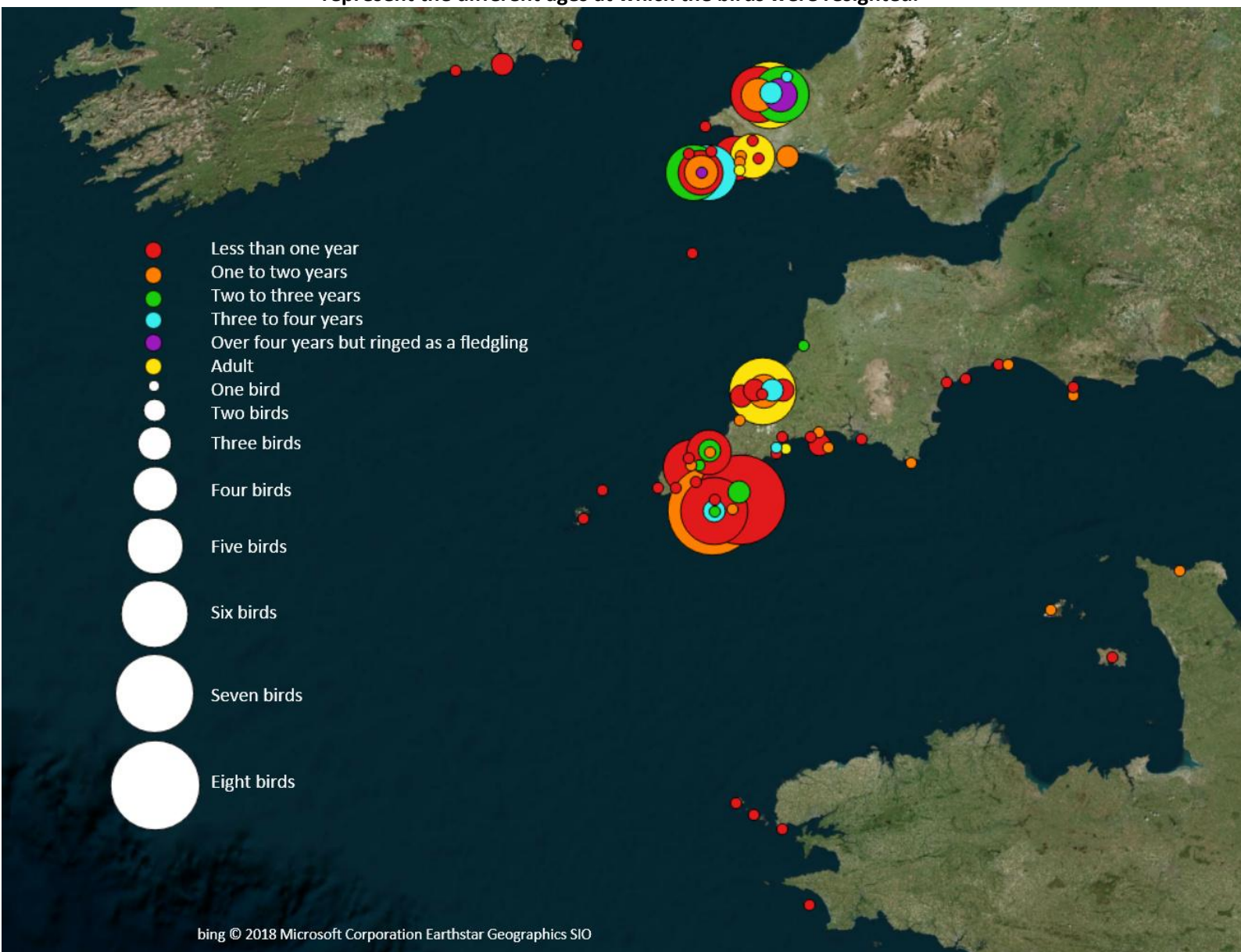
Productivity estimates 2005-2018 (average number of fledglings per sample pair).

2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
0.76	1.07	1.02	1.02	-	0.71	0.89	-	1.80	0.93	1.66	1.38	1.54	1.40

In an effort to further understand recent population growth, a Great Black-backed Gull colour ringing project was begun in 2014, in part to shed light on juvenile survival and recruitment. Of 43 fledglings ringed in 2014, 28 (65.12%) have been resighted subsequently including four which have been found dead. At least 15 birds (34.88%) definitely survived their first full year, 11 (25.58%) survived their second years, seven (16.28%) survived their third years and four (9.30%) have survived at least four years. Of 52 fledglings ringed in 2015, 25 (48.08%) have been resighted subsequently, 15 (28.85%) survived their first full year, 12 (23.08%) survived their second years and ten (19.23%) survived their third years. Ten of the 31 2016 fledglings and seven of the 39 2017 fledglings have been seen again. Although these figures do not give an exact measure of juvenile survival, the birds ringed longer ago (of which more have returned to Skokholm and for which there has been longer for them to be encountered on the mainland), suggest that nearly 10% of fledglings could be surviving to breeding age. Only time will tell whether this study provides a sound estimate of recruitment to the breeding population, something which may well be dependent on how many birds establish territories on Skokholm or Skomer (where they should be seen) as opposed to other less studied breeding sites. Of 13 youngsters which have so far returned to Skokholm, four were back in their first summers, two in their second summers and seven in their third summers. Although resighting records away from Skokholm will be somewhat biased by a preponderance of birders at the main roost sites in Cornwall, it seems likely that there is a genuine southerly bias to the movements of young Skokholm Great Black-backed Gulls (see map below). All of the records below were received since a similar table was published in the 2017 Seabird Report.

Darvic	Ring	Location	County	Age	Date
W:015	HT94858	Nevern Estuary	Pembrokeshire	Adult	08/12/18
W:022	HT94867	Camel Estuary	Cornwall	Adult	22/11/18
W:026	HT94871	Nevern Estuary	Pembrokeshire	Adult	20/06/18
W:031	HT94876	Nevern Estuary	Pembrokeshire	Adult	21/03/18
W:037	HT94899	Nevern Estuary	Pembrokeshire	Fourth-summer	26/08/18
W:055	HT94917	Nevern Estuary	Pembrokeshire	Fifth-winter	25/03/18, 11/10/18
W:066	HT94926	Teifi Estuary	Pembrokeshire	Fourth-summer	20/05/18
W:073	HT94930	Nevern Estuary	Pembrokeshire	Fourth-summer	01/08/18
W:079	HT94936	Nevern Estuary	Pembrokeshire	Adult	29/03/18
W:087	HT94948	Camel Estuary	Cornwall	Fourth-winter	25/11/18
W:089	HT94950	Nevern Estuary	Pembrokeshire	Third-summer	12/05/18
W:094	HT94957	Nevern Estuary	Pembrokeshire	Third-summer	23/03/18, 18/05/18
W:112	HT94974	Nevern Estuary	Pembrokeshire	Fourth-winter	14/08/18, 15/09/18
W:116	HT94976	Mevagissey Harbour	Cornwall	Fourth-winter	23/10/18
W:169	MA37827	Southerly Point, Lizard	Cornwall	Second-winter	11/01/18
W:184	MA37851	Camel Estuary	Cornwall	Adult	03/12/18
W:195	MA37862	Camel Estuary	Cornwall	Second-winter	29/11/18
W:214	MA37879	Nevern Estuary	Pembrokeshire	First-summer	20/03/18, 21/06/18
W:217	MA37882	Dawlish Warren	Devon	First-winter	23/03/18
W:248	MA37917	St Mary's, Scilly	Cornwall	First-winter	27/08/18
W:248	MA37917	Wembury Point	Devon	First-winter	04/09/18
W:259	MA37904	Newlyn Harbour	Cornwall	First-winter	08/12/18
W:261	MA37906	Korz, Ushant Island	Brittany, France	First-winter	07/01/19, 08/01/19
W:262	MA37907	Bristol Channel	At sea	First-winter	20/10/18
W:271	MA37928	North of Scilly Archipelago	At sea	First-winter	27/08/18

The movements of Skokholm ringed Great Black-backed Gulls 2014-2018. The different colours represent the different ages at which the birds were resighted.



A roost of up to 40 birds, but more typically less than 23, regularly formed in the Bog during the breeding season; on average these were the smallest breeding season roosts of the last six years (perhaps in part due to the low adult return rate which may have allowed more non-breeders to recruit to the breeding population). The first fledglings were recorded at North Pond on a rather typical 3rd July, however it was not until mid-August that the larger communal roosts began to develop, with 64 on the 19th, 68 on the 24th, 126 on the 27th and 121 on the 28th; as was the case last year, the largest roosts formed on North Plain and the Head. September roost counts were also lower than in recent years, with highs of 81 on the 20th, 128 on the 21st and 135 on the 22nd being well down on peaks of 183 in 2017, 247 in 2016 (when there were also six counts in excess of 200 birds), 249 in 2015 and 355 in September 2013 (the September 2014 maximum was only 52). The first Skokholm fledglings to be seen away from the Island were logged on 27th August, with birds photographed on St Mary's, Scilly and at sea to the north of the archipelago; this was 14 days earlier than the first southwest resighting of 2017, 34 days earlier than the first of 2016 and 19 days earlier than the first of 2015. Despite the fact that some youngsters seemingly made an early departure from Skokholm, a bird along the south coast did not fledge until 27th August and another on Gull

Rock fledged on an exceptionally late 8th September. As was the case last year, there were only two October counts in excess of 100 individuals (seven counts in 2016), with highs of 126 on the 9th and 108 on the 10th. Following a total of 58 logged on 14th October, there were no counts above 23 until the departure of staff on 26th November and 35 counts of fewer than ten individuals included five days without a record. November counts were thus the lowest of the last six years and well down on 2013 highs of 270 and 243 (both of which occurred in the first five days of the month).



Herring Gull *Larus argentatus*

Gwylan y Penwaig

Common Breeder abundant breeder in the 1970s

26 trapped (including 6 pulli), 4 retrapped

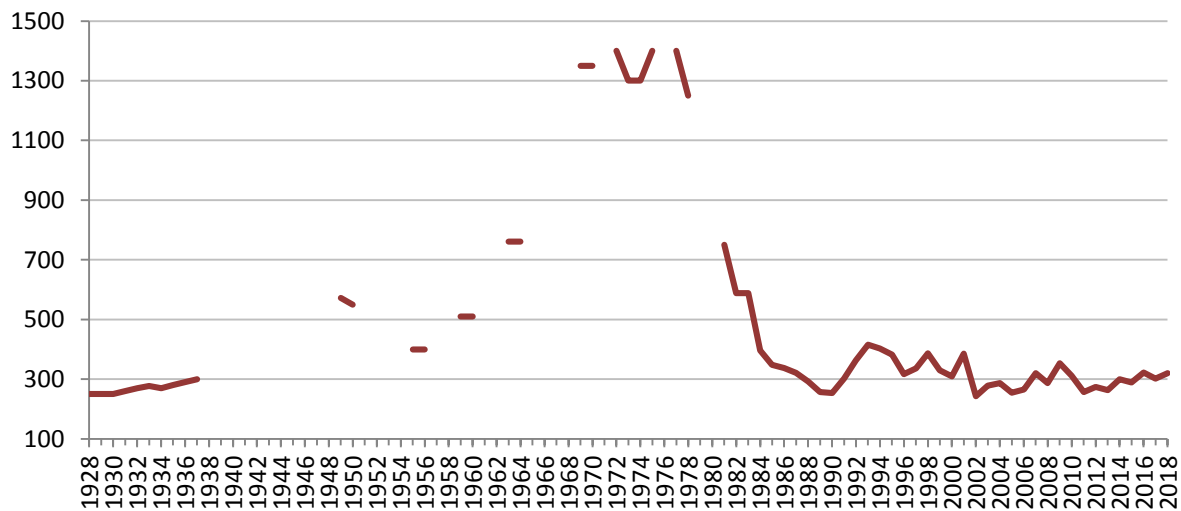
1936-1976: 13,164 trapped, 2013-2017: 88 trapped, 13 retrapped, 1 control

Although March counts again fluctuated widely, with birds frequently feeding away from Skokholm but returning to roost, the peaks were well up on recent years; there were eight counts in excess of 200 individuals (the March peak was 176 in 2017), with highs of 294 on the 20th, 325 on the 24th and 439 on the 15th, the latter of which was the second highest March count of the last seven years (only down on the 444 of 29th March 2015). In stark contrast to observations made of Lesser Black-backed Gulls during the same period, Herring Gull roosts included reasonable numbers of subadult birds, with up to 65 joining March gatherings and a minimum of 120 along the south coast on 14th April. The first eggs were found in two nests on 19th April, one day later than the first of 2017 and two later than the first of 2016 (the first egg was found on 25th April in 2015, 14th April in 2014 and 18th April in 2013). Birds were again watched feeding behind potting vessels during the early part of the breeding season, with over 100 following 'Boy's Pride' as they washed their decks on 27th April. Whole Island counts took place between the 18th and 22nd May when 320 active nests were located. This was a 6.0% increase on the 302 nests found in 2017 and 8.1% up on the 2008-2017 mean (295.9 ±sd 28.78); there have only been three higher totals since 2000. The number of breeding pairs has apparently stabilised at a level close to that seen in the 1930s (the 1928-1937 mean was 269.70 ±sd 17.47), counts well down on the artificial peak of the 1970s.

The monitoring of adult survival in Herring Gulls has been undertaken on Skomer for many years, however recent struggles with trapping sufficient adult birds to produce a reliable estimate led to

the Islands Conservation Advisory Committee recommending that a project be established on Skokholm in 2017; the Neck was selected as the study area and 13 nesting adults were trapped there between the 18th and 22nd May last year. Each trapped adult was ringed with a red darvic inscribed W:9** in white, the latter two digits identifying the bird as an individual. Of the 13 marked birds, 11 returned to breed in the same area this year (84.62%); this was similar to the 86.10% return seen in Great Black-backed Gulls this year and perhaps suggests that similar factors are influencing survival in these species. The only individual seen away from Skokholm was W:987 which was at the Nevern Estuary, Newport on three October and two November dates; this bird also visited the Nevern in September 2017 suggesting that there might be some site fidelity during the non-breeding period. A further 15 adults were colour ringed this year, taking the total to 26 (although one was found dead less than two months later).

The number of breeding pairs 1928-2018 (where data exists). The 1970s peak was attributed to the exploitation of local fish waste and the decline to botulism (Thompson, 2007).



The number of breeding pairs and productivity estimates (average number of fledglings per sample pair) 2004-2018.

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
287	255	265	320	287	353	312	257	274	263	300	289	322	302	320
0.18	0.57	0.47	0.61	-	-	0.82	0.67	1.15	0.72	0.70	0.66	0.86	0.70	0.73

The first chicks were seen at Near Bay on 18th May, four days before the first of last year, and the first flying fledglings were logged on 4th July (7th July in 2017, 30th June in 2016, 10th July in 2015, 2nd July in 2014 and 7th July in 2013). Checks of the Neck productivity plot in early July, where 149 pairs had established nests, located a maximum of 109 fledging-sized young (which equates to a productivity estimate of 0.73 fledged young per pair). Although 4.3% up on the 0.70 logged in 2017, this was 7.6% down on the 2008-2017 mean (0.79 \pm 0.05). Nevertheless there have been lower productivity estimates in nine of the previous 12 years with an assessment and, following good years in 2012 and 2016, it appears that current levels are sufficient to sustain a stable breeding population at this time. Herring Gull productivity remains consistently higher than that of the closely related Lesser Black-backed Gull, circumstantial evidence suggesting that this may be due to differing feeding habits. Additionally Great Black-backed Gulls seemingly target the coastal nesting Herring Gulls less frequently than they do the inland gull colonies, although predation by Greats was again witnessed this year and probably led to an underestimate of the Herring Gull population due to the emptying of nests prior to the whole Island count.

The customary post-breeding departure of both adults and fledglings saw July counts after the 12th peak at 157 on the 31st but otherwise fail to exceed 104. There were 21 August daycounts of under 100, but highs of 295 on the 4th and 177 the following day, when birds were feeding on swarming ants, and further highs of 192 on the 21st and 199 on the 31st; the peaks were thus down on August 2017 counts of 348 and 409, birds which were also attracted to swarming ants. As in the previous five seasons, few Herring Gulls visited Skokholm in September, with only two daily totals in excess of 39 individuals, namely 81 on the 26th and 78 on the 27th. October counts remained low until the 24th when 187 birds included 112 in Broad Sound; Broad Sound October daycounts were thus well down on the all-time record of 493 set last year. Early November proved more productive, with highs of 339 on the 2nd, 318 on the 4th and 304 on the 5th, whilst a late peak of 275 was logged on the 20th; nevertheless there were 11 daycounts of under 100 and the maximum was well down on the 585 of 2015, the 588 of 2016 and the November record 612 logged on the 3rd in 2017.

Ringling recovery GR87923

Originally ringed as an adult, SKOKHOLM GULL TRAP 10th July 2015

Recovered NEYLAND, PEMBROKESHIRE 1st July 2018

Finding condition Metal ring read in field

Distance travelled 23km at 91 degrees (E)

Days since ringed 1087

Lesser Black-backed Gull *Larus fuscus*

Gwylan Gefnddu Leiaf

Abundant Breeder previously very abundant breeder

103 trapped (including 68 pulli), 9 retrapped, 3 controls

1936-1976: 12,085 trapped, 2013-2017: 415 trapped, 15 retrapped, 13 controls

Although well down on the 823 of 2016, a mean March daycount of 568 was up on the low of 494 logged last year. The number of birds within the colonies again fluctuated considerably during the day; the Frank's Point colony contained 42 birds on the morning of the 17th but 156 by the evening, 24 on the morning of the 18th and 90 by the evening and eight on the morning of the 18th but 40 by the evening. The larger communal roosts recorded in previous years were again generally absent, with the majority of March counts being of birds on territory; the largest roost away from the breeding colonies was of only 35 birds at North Pond on the 12th. A more detailed description of how the gulls prepare for the breeding season was available in 2015 and 2016 due to the GPS trackers fitted by the British Trust for Ornithology in 2014 (funded by the Department of Energy and Climate Change) which gave some idea as to when birds first returned to Skokholm (see the relevant Skokholm Seabird Reports for details of return dates and the range of over-wintering strategies used); the last of the functioning trackers and the base station were removed last year.

Peak April counts were marginally down on last year and there were again mass departures from the Island, for example the Bog subcolonies contained 750 birds on the 21st but a high of only 180 the following day. There were occasional roosts away from the main subcolonies during the month, peaking at 200 around North Pond on the 28th and 80 at the same site on the 2nd; the largest April roost in 2017 was of 260 birds. All of the apparently incubating birds checked at the Top Tank on the 23rd were found to be sitting on empty nests and it was not until 26th April that the first lone egg was located; this was five days earlier than the first of 2017, one day later than the first of 2016, eight days earlier than the first of 2015 (when two nests south of North Pond contained three eggs and three contained a single egg) and two days later than in 2014 (when a single egg was again found).



Vantage point counts of all the inland breeding subcolonies and a full census of the coast nesting pairs were made between the 18th and 22nd May, during which 947 apparently incubating adults were located (the second lowest total in over 50 years which, although up on the 903 of last year, was well down on the 1209 of 2016, the 1275 of 2015, the 1407 of 2014 and the 1476 of 2013). Walk through counts were undertaken at five subcolonies on the 23rd to check the accuracy of the point counts. A comparison of the number of apparently incubating adults and the number of nests containing eggs suggested that there was a discrepancy (see table below). All five plots contained more nests with eggs than the number of apparently incubating adults (aia), presumably due to incubating birds being hidden in vegetation; this was most apparent to the west of Orchid Bog where there were 34.48% more nests containing eggs than aia and to the north of the Top Tank where there were 20.97% more nests with eggs, whilst there were only 1.54% more to the south of North Pond. On average across the five plots there were 14.66% more nests containing eggs than were predicted during the vantage point counts (305 with eggs compared with 266 aia during the counts); in 2017 there were 27.32% more nests with eggs than picked up during the vantage point counts, in 2016 there were 18.18% more, in 2015 25.00% more and in 2014, when the vegetation was particularly low, there were 12.89% more. A correction factor of 1.15 (305/266) was thus applied to inland vantage point plots containing similar dense vegetation to that encountered in the walk through plots, but not to the cliff counts and areas of very short sward.

The corrected total for the inland plots was 648 pairs. This, combined with the 305 nests with eggs encountered on the walkthroughs and the 116 birds incubating in open areas, gave a 2018 whole

Island total of 1069 pairs. This was 4.8% down on the 1123 pairs recorded in 2017, down on the 1397, 1486, 1565 and 1476 pairs logged in 2016, 2015, 2014 and 2013 respectively and the lowest predicted total of the post-War era.

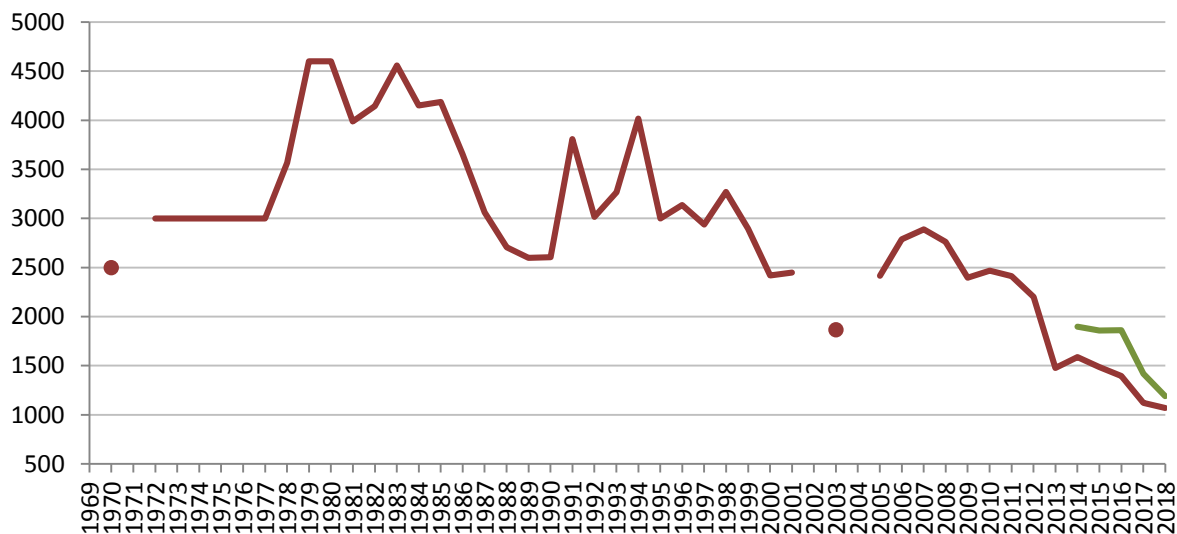
A comparison of vantage point counts (of apparently incubating adults) and walk through nest counts, along with a summary of nest contents.

	Vantage point count	Walk through count	Empty/ With egg(s)	Percentage of empty nests	Difference between counts*	Difference between counts**	Egg count	Eggs per nest with eggs
Spy Rock S	38 aia	49 nests	4/45	8.16%	+18.42%	+28.95	127	2.82
Top Tank N	62 aia	76 nests	1/75	1.32%	+20.97%	+22.58	211	2.81
North Pond	65 aia	72 nests	6/66	8.33%	+1.54%	+10.77	179	2.71
Orchid Bog	29 aia	41 nests	2/39	4.88%	+34.48%	+41.38	111	2.85
Frank's Point	72 aia	83 nests	3/80	3.61%	+11.11%	+15.28	223	2.79
Total	266 aia	321 nests	16/305	4.98%	+14.66%	+20.68	851	2.79

* How many more/less nests with eggs were present than the number of apparently incubating birds seen (%).

** How many more/less nests (including empty nests) were present than the number of apparently incubating birds seen (%).

The total number of Lesser Black-backed Gull breeding pairs 1970-2018. Control measures started in 1984 (destruction of nests) and stopped in 1998. The green line is the population if all empty nests are assumed to belong to additional pairs.



As the walk through plots mirrored those used in recent years, a direct comparison can be made. The most striking decline occurred at the Frank's Point colony (to the north of the Pedestal) where there were 32.2% fewer nests containing eggs than last year, although there were also large drops of 20.4% at Orchid Bog and 15.7% to the north of the Top Tank. The same three colonies have declined by 36.5%, 27.8% and 20.2% since 2016 respectively and 37.5%, 46.8% and 31.8% since 2014. The only plot this year where an increase was noted was to the south of North Pond where there were 3.1% more nests with eggs (although the number of empty nests dropped from 22 to six). Given the poor productivity witnessed for many years, it is no surprise that the Skokholm breeding population is declining, however it was also recently suggested that disease may be taking its toll; there were 21 dead adults found between 4th March and 1st August 2016 which were thought to be diseased, with the period before death characterised by very lethargic behaviour, fine shaking and an eventual loss of limb control, however only one adult was seen with similar symptoms last year (an additional two adults were found dead). There were 15 dead adults with no obvious injuries located between 23rd

May and 11th July this year; although aggressive interactions may have caused death in some instances, one on 9th May had a particularly dirty vent. A very weak bird handed in from a passing boat on 20th May exhibited the same symptoms prevalent in 2016. Unusually a bird at Crab Bay on 31st July was spinning in circles and aggressively biting its own carpal, a behaviour which was exhibited by a bird at the same site in June last year. A bird tarred with a thick black substance on 13th June was not seen again.

Over the period 1991-2002 the count of empty nests varied from 11-44% of the total number of nests, with a mean of 22.7% (Thompson, 2007), however the proportion of empty nests has more recently declined. All five colonies visited this year contained fewer empty nests than Thompson's lower extreme. The Top Tank north and Frank's Point colonies again held the lowest proportion of empty nests, with only 1.32% and 3.61% respectively (1.11% and 1.67% in 2017); intriguingly these two colonies have contained the lowest proportion of empty nests for the last four years, with the former containing 1.96% in 2016 and 7.45% in 2015. Overall, of 321 visited nests, 4.98% were found to be empty this year (9.86% in 2017, 17.62% in 2016, 17.30% in 2015, 16.32% in 2014 and 19.84% in 2013). It was unclear whether the empty nests were second nests made by the pairs present, nests which had been robbed of eggs or nests where the adults had yet to lay. The breeding season was certainly a protracted one, with the first chicks located on 23rd May (24th May in 2017) and at least three nests still containing hatching eggs on 5th July when the first flying fledgling was logged (the first fledgling was logged on the 7th in 2017). It would certainly seem possible that at least in some cases the latter two of the above three options may have been the case, meaning that the Skokholm breeding population is actually higher than that calculated above. However, even if we wrongly assume that all empty nests belonged to additional pairs (the green line on the above chart), the predicted Island total would only be in the region of 1190 pairs (an extra 121 pairs, 227 fewer than the comparable 2017 estimate and still the lowest population estimate for over 50 years).

Lesser Black-backed Gull productivity estimates.

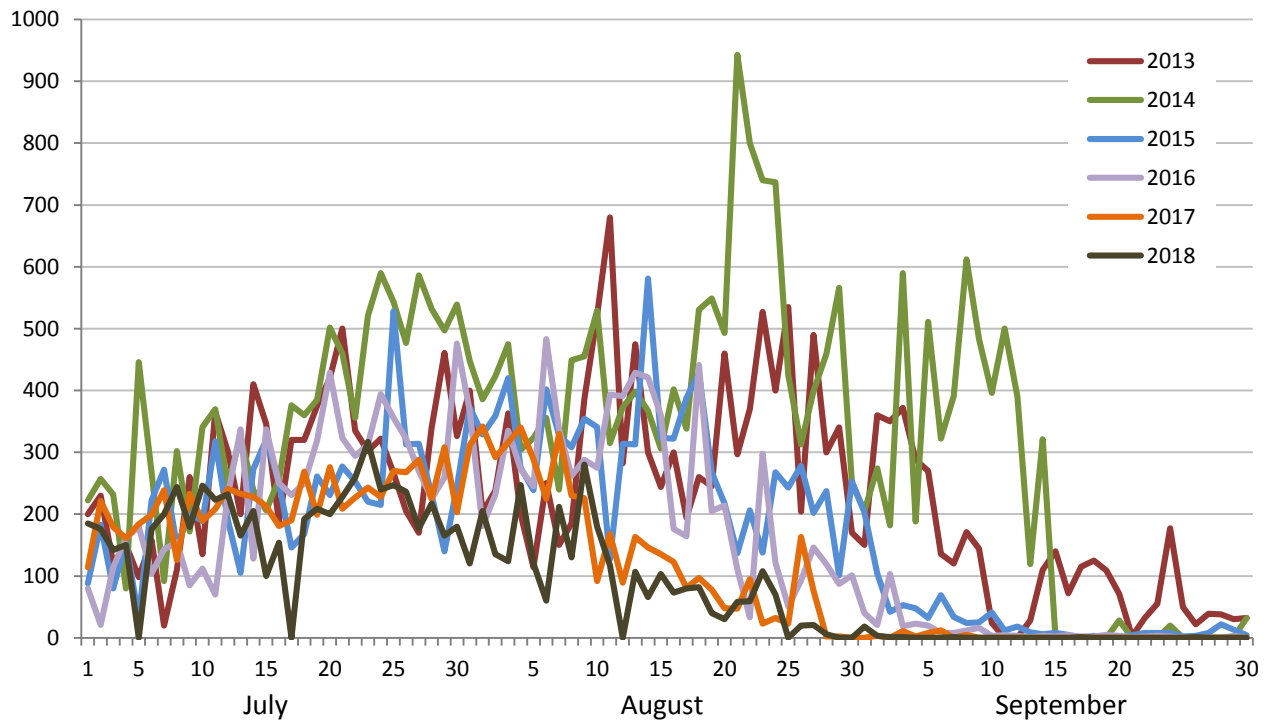
2004	2005	2008	2011	2012	2013	2014	2015	2016	2017	2018
0.07	0.27	0.27	0.03	0.16	0.16	0.30	0.15	0.23	0.38	0.63

The colonies at Frank's Point and to the north of the Top Tank again proved suitable for productivity monitoring this year (using BTO rings as a mark for a mark/recapture population estimate). In an attempt to increase the number of resightings, the colonies were again re-entered this season (rather than observing fledglings at a distance with a telescope, a method which was failing to locate many rings due to the long sward which has resulted from recent low Rabbit numbers). A simple calculation was again used, (number of fledglings ringed x number checked for rings on second visit)/ number of birds found to have rings on second visit, to predict the number of fledglings within an area. There were 17 fledglings ringed at the Top Tank and, of 13 subsequently checked for rings, three were marked; it is thus predicted that the 75 pairs produced 74 fledglings, giving a productivity figure of 0.99. There were 13 fledglings ringed at Frank's Point and, of only nine birds subsequently checked, five were marked; it is thus predicted that the 80 pairs produced only 23 fledglings, giving a productivity figure of 0.29. Pooling the 2018 inland observations suggests that 155 pairs produced 97 young and that overall productivity was in the region of 0.63 fledglings per pair. This is the highest estimate this century, however some observations from elsewhere did not suggest that 2018 productivity was up on recent years; although fledglings at North Pond could potentially have come from anywhere on Skokholm (and possibly elsewhere), a maximum of 65 logged on the 23rd and 27th July was 51.1% down on the 133 counted there on 1st August 2017 and was the lowest total from this site during the last five years (it should be remembered that the breeding population has fallen considerably during the same period).

The coastal slope to the east of Purple Cove was investigated for a second year as this discreet subcolony, with very short sward or rocky substrate, is seemingly suitable for an accurate fledgling

count using only a telescope; here 14 pairs produced a minimum of 17 fledglings, giving a productivity figure of 1.21 per pair (18 pairs produced 20 fledglings in 2017, giving a productivity figure of 1.11). That productivity is consistently higher in a smaller, coastal subcolony fits ad hoc observations made in recent years and perhaps supports the theory that birds in larger colonies are struggling in part due to intraspecific predation. Given that recent productivity estimates have been based on samples of inland colonies, it seems plausible that there will have been an underestimation for Skokholm as a whole; nevertheless considerably more pairs nest in the main inland colonies than on the coastal slopes, suggesting that the actual figure would not change radically.

The number of Lesser Black-backed Gulls roosting on North Plain and in the vicinity of North Pond 2013-2018.



North Plain and the area around North Pond again proved to be the usual site for the largest post breeding roost, with smaller numbers congregating around the coast and at South Pond. As is typically the case, the number of birds using the roosts increased during July, however, despite the higher 2018 productivity estimate, there were again fewer birds present this year; the July total was 16.0% down on 2017 and the lowest of the last six years. Nevertheless the peak July count, the 317 logged on the 23rd, was 2.9% up on that of 2017 (albeit 33.4% down on the maximum 2016 roost). Whereas the previous five years have seen the majority of the largest roost counts logged in August, this year saw an earlier drop in numbers; the August total was 35.6% down on last year and the peak count, the 280 logged on the 9th, was 18.1% down on 2017, 42.0% down on 2016, 51.8% down on 2015 and 70.3% down on the 2014 maximum of 943 roosting birds. September proved exceedingly quiet, with only eight roosting birds logged during the entire month; the last four years have seen very small September roosts, quite the contrast to 2013 and 2014 when counts were still regularly in the hundreds. A small number of birds visited Skokholm in October, with 50 logged over 18 dates and a high of eight on the 18th. In November there were sightings on 21 dates to the 26th, totalling 140 birds and including highs from South Haven and Broad Sound of 20 on the 16th, 31 on the 19th and 26 on the 21st.

Ringling recovery 6217252 (white darvic with black N:3PH)
Originally ringed as an adult, MALAGA, SPAIN 13th January 2018
Previously recovered MALAGA, SPAIN 3rd February 2018

Recovered PURPLE COVE, SKOKHOLM 28th April 2018

Finding condition Colour ring read in field. Left foot missing

Distance travelled 1666km at 357 degrees (N)

Days since ringed 105

Such traumatic injuries are usually linked to entanglement in fishing equipment.

Ringing recovery D9123 (black darvic with white 5FA2)

Originally ringed as a third-year female, CHOUET LANDFILL, GUERNSEY 13th May 2015

Previously recovered MATOSINHOS, PORTO, PORTUGAL 7th August 2015

Previously recovered MATOSINHOS, PORTO, PORTUGAL 4th September 2015

Previously recovered MATOSINHOS, PORTO, PORTUGAL 25th September 2015

Previously recovered MATOSINHOS, PORTO, PORTUGAL 4th November 2015

Previously recovered MATOSINHOS, PORTO, PORTUGAL 5th November 2015

Previously recovered MATOSINHOS, PORTO, PORTUGAL 2nd September 2016

Previously recovered MATOSINHOS, PORTO, PORTUGAL 6th October 2016

Previously recovered MATOSINHOS, PORTO, PORTUGAL 31st January 2017

Previously recovered MATOSINHOS, PORTO, PORTUGAL 9th March 2017

Previously recovered MATOSINHOS, PORTO, PORTUGAL 12th September 2017

Previously recovered MATOSINHOS, PORTO, PORTUGAL 13th October 2017

Previously recovered MATOSINHOS, PORTO, PORTUGAL 19th October 2017

Recovered NORTH PLAIN ROOST, SKOKHOLM 26th August 2018

Subsequently recovered MATOSINHOS, PORTO, PORTUGAL 3rd September 2018

Subsequently recovered MATOSINHOS, PORTO, PORTUGAL 17th October 2018

Subsequently recovered MATOSINHOS, PORTO, PORTUGAL 13th November 2018

Finding condition Colour ring read in field

Distance travelled 311km at 320 degrees (NW)

Days since ringed 1201

Ringing recovery GK92374

Originally ringed as a pullus, SKOMER ISLAND, PEMBROKESHIRE 18th July 2001

Recovered SKOKHOLM 14th June 2018

Finding condition Dead, fresh and undamaged

Distance travelled 4km at 163 degrees (SSE)

Days since ringed 6175

The birds previously carrying GPS tags, along with an additional 48 non-tagged controls, were all fitted with yellow darvic rings with a black alpha-numeric code (number/letter:W e.g. 5A:W) in 2014. The colour ring is on the left leg and a BTO metal ring on the right. The darvic rings have yielded a fantastic number of field resightings; the 73 ringed birds have produced 157 separate resightings of 35 different individuals away from Skokholm. However the number of resightings logged each year is unsurprisingly dropping and another two birds were confirmed as dead this year. The following table summarises resightings received since similar tables were published in the 2014-2017 Seabird Reports. As has been shown by the British Trust for Ornithology GPS tracking project on Skokholm, and at other British Trust for Ornithology tracking sites (Ross-Smith, *pers. comm.*), Lesser Black-backed Gulls show a high degree of wintering site fidelity. This is also reflected in the colour ringing data, with 16 birds having been resighted at the same location in successive winters; records of returning birds have come from several sites in Portugal and Spain along with two in France and one in Morocco.

Darvic	Ring	Location	Country	Date
5P:W	GR98209	Costa da Caparica, Almada	Portugal	30/09/18
6U:W	GR98226	Malaga Harbour	Spain	18/03/18 (found dead)

7N:W	GR98240	Salisbury Pig Farm	UK	16/11/18
8C:W	GR98248	Caleta de Velez, Malaga	Spain	24/01/18
9H:W	GR98264	Praia de Matosinhos	Portugal	10/10/18, 16/10/18
9H:W	GR98264	Pinto Landfill, Madrid	Spain	12/01/19
9J:W	GR98265	Malaga Harbour	Spain	02/12/18, 08/12/18, 05/01/19
9X:W	GR98275	Mira Beach, Coimbra	Portugal	21/09/18

Guillemot *Uria aalge*

Gwylog

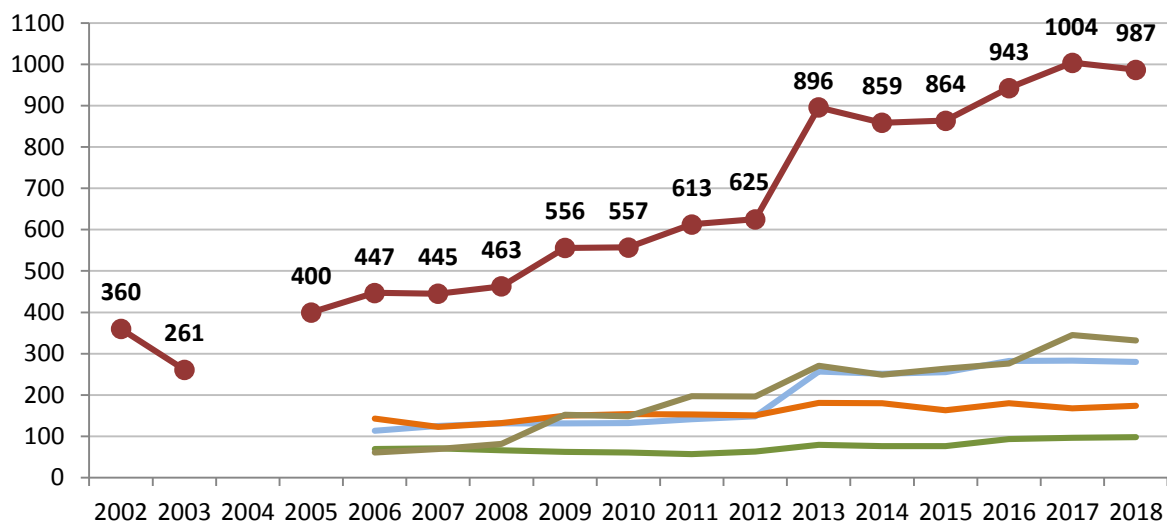
Abundant Breeder

1 pullus trapped, 1 control

1936-1976: 1023 trapped, 2013-2017: 3 pulli trapped, 16 controls

Although a full complement of Guillemot were seemingly present upon the 6th March return of staff, along with a similar number the following day, there were no birds logged at all between the 8th and 10th. Despite high counts of 3328 on the 16th and 3159 on the 21st, there were a further seven March dates without a record and five dates with fewer than 32 birds logged. Customary departures for the sea continued in April, with no birds seen at all on eight dates and eight further counts of 290 or less before the end of the month, including 68 on the 25th which was the last significant pre-breeding departure (16 mass departures was three more than logged in April 2017, 2016 and 2015 but three fewer than in 2014 and 2013). Although a bird was probably incubating at North Gully from 1st May, the first egg to be seen in 2018 was at Twinlet on the 4th; the first egg of 2017 was on the early date of 29th April, the first of 2016 on 5th May, the first of 2015 on 2nd May and the first of 2014, following the prolonged storms and significant auk wrecks of the preceding winter, was on 15th May. Whereas colony attendance continued to fluctuate during the first half of May in 2013 and 2014, the last four seasons have seen consistently high totals from early in the month.

The total number of adult birds in all six study plots 2002-2018 (as an average from ten visits) and the totals from the four largest plots (as an average from ten visits).



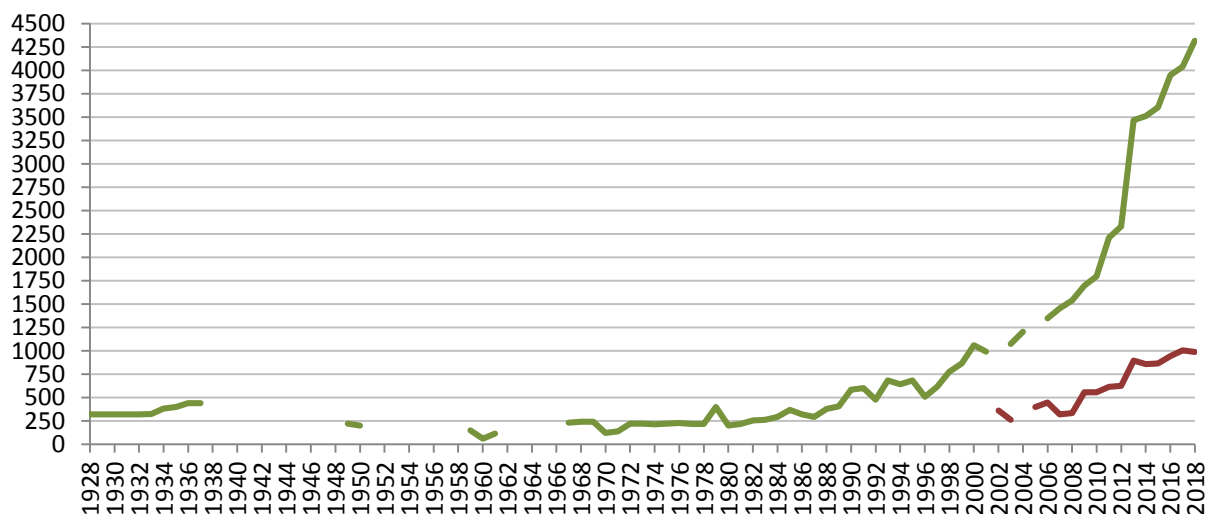
The six study plots were counted on ten dates between the 2nd and 11th June. The mean total from all plots was 987 adults on ledges; this was 1.7% down on the record total set last year but 24.9% up on the 2009-2018 mean (790.4 ±sd 181.68). An average of 13 fewer birds were on ledges at North Gully, an area which has seen remarkable growth from a ten visit mean of 61 birds in 2006 to 332 this year, whilst there were smaller declines of five birds at the slope to Purple Cove, four birds at Middlerock and three birds at Little Bay Point. Conversely there was a mean of six extra birds at Twinlet and two extra birds at Steep Bay. There are perhaps several factors influencing this apparent plateau in study plot numbers. At Twinlet and Middlerock the Razorbill counts have also stabilised,

whilst Fulmar activity has increased to the point where eggs are lost during intraspecific encounters; it seems possible that Fulmars will halt any further expansion of auks along their current ledges and may even exclude birds from areas previously occupied. There are however Fulmar-free areas within the study plot boundaries seemingly suitable for colonisation by cliff nesting auks, although whether these will be selected over other non-study plot sites remains to be seen. The 2018 study period was dominated by high pressure, more so than in 2017 when three counts were delayed due to inclement weather; fine 2018 weather was perhaps responsible for consistent plot counts over the ten surveys and the lowest standard deviation recorded during the last six years. It is possible that some higher counts and thus the higher standard deviation observed last year were due to ameliorating rough weather encouraging more birds to the cliffs; the highest 2017 count occurred the day after a westerly near gale and the third highest count also followed a rough non-survey day.

The whole Island totals, mean plot totals and the percentage of the Island totals made up of study plot birds 2009-2018. Also the range of plot counts since 2012 and the standard deviation observed over the ten plot visits since 2013. (*includes a boat-based count)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Island	1697	1795	2212*	2330	3466*	3512*	3603*	3949*	4038*	4316*
Plots	556	557	613	625	896	859	864	943	1004	987
Range				530-746	824-949	797-947	756-939	887-1003	939-1144	937-1060
±SD					39.20	54.25	58.30	40.25	57.45	37.38
Plot %	32.8	31.0	27.7	26.8	25.9	24.5	24.0	23.9	24.9	22.9

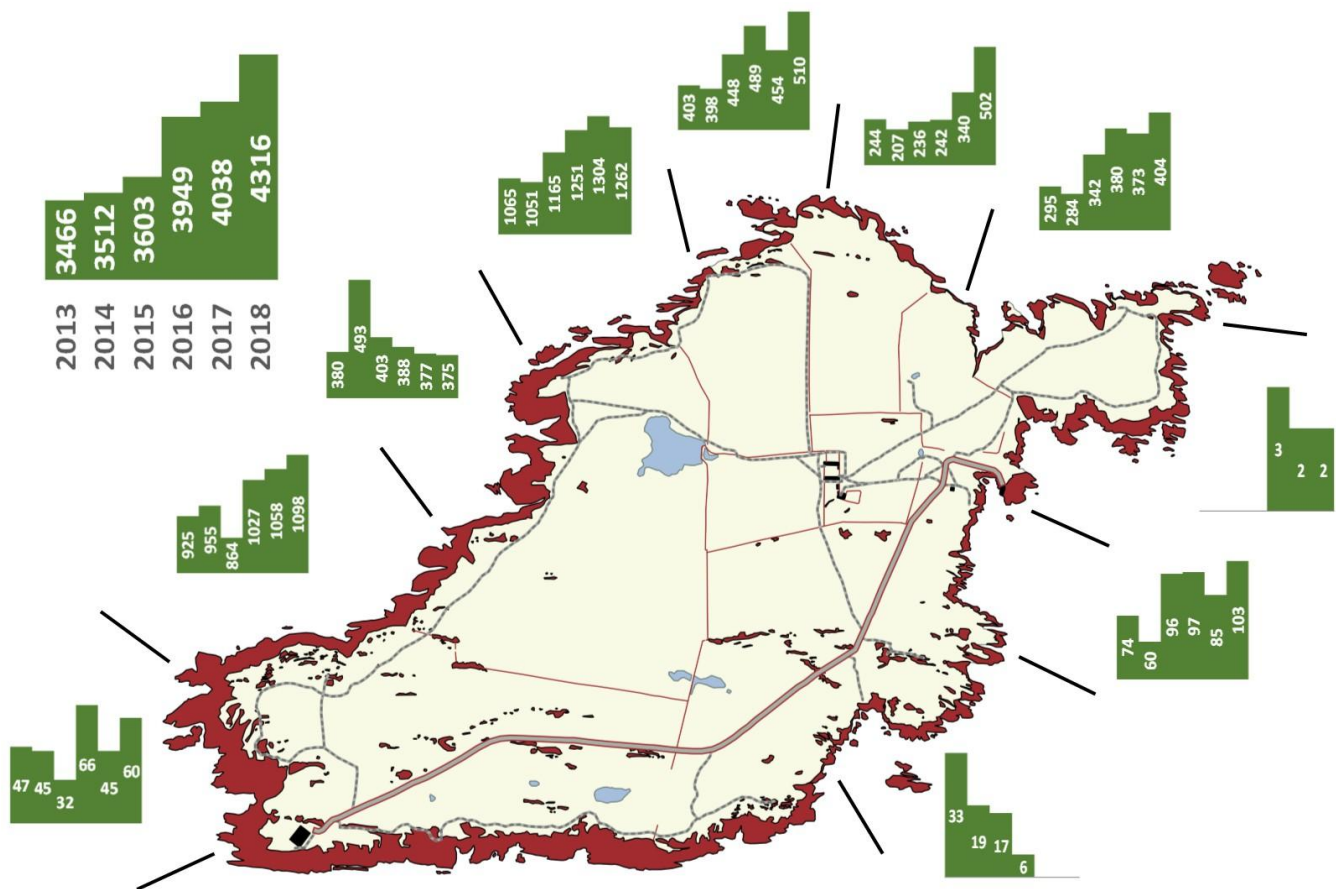
The total number of Guillemots (adults on ledges) recorded on Skokholm since 1928 and the number of birds within the study plots since 2002.



Whole Island counts were made from the land between the 4th and 10th June and calm seas allowed for a boat-based count on the latter date. Boat-based surveys allow some areas to be monitored which cannot be viewed from on the Island and enable closer access to some areas which can normally only be viewed at a distance. A mean total of 4316 adults in suitable breeding habitat was a 6.9% increase on the 2017 count and the highest total yet recorded on Skokholm. Although down on the 2009-2018 average of 11.76% growth per year, the increase was the largest since 2015 and the fourth largest of the last ten years. The proportion of the whole Island count made up of study plot birds (22.9%) was down on the 2013-2018 average of 24.4%, perhaps suggesting that some of the factors influencing the more intensively studied plots (discussed above) are not impacting the whole Island population in the same way. Additionally the Island count is based on fewer visits and only one boat-based survey, meaning that the total is more likely to be further from the actual mean. As can be seen from the below map, the largest increase was, for a second consecutive year, observed along Near and Far Bays (162 more birds); the reason for such rapid growth in this area compared

with the rest of the Island is unclear, although it may reflect the availability of previously unoccupied habitat. The second largest increase was observed around Little Bay where an additional 56 individuals reversed the apparent decline witnessed in 2017. The only sizable drop in numbers occurred around North Gully and the Jogs where a mean of 42 fewer adults on ledges was logged. These counts of individuals on ledges potentially include incubating adults, some of their partners, failed breeders, non-breeding adults and younger birds yet to breed; a correction factor is thus sometimes adopted to convert the count to an estimate of breeding pairs (Harris *et al.*, 2015). A 2015 survey on Skokholm found the correction factor to be 0.64, a figure similar to the 0.67 widely adopted in previous studies (see the Skokholm Seabird Report 2015); the latter correction factor predicts the Skokholm breeding population to be in the region of 2892 pairs.

The distribution of Guillemots on suitable breeding ledges 2013-2018.

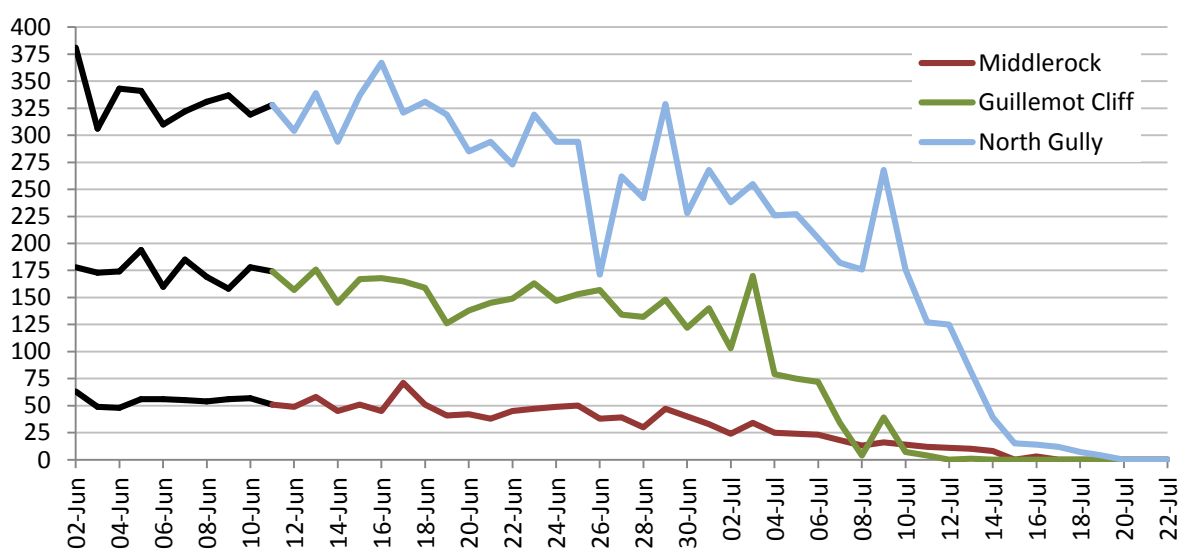


The first chick to be seen this season was found at Little Bay on 4th June, two days later than the first of 2017 but two days before the first of 2016, three days before the first of 2015 and nine days before the first of 2014 (the year following the severe winter wrecks). Productivity, calculated at between 0.55 and 0.61 chicks per pair in 2013 and 0.6 in 2007, was not assessed in 2018 in accordance with recommendations from the Islands Conservation Advisory Committee. Chicks were jumping from mid-June and the number of adults recorded in the three regularly monitored plots dropped steadily from 580 on the 16th to 390 on the 30th. There was a typical late spike in numbers on 29th June, an increase observed across the Island as a whole and which was seen to a lesser extent in the number of Razorbills present. Something of an exodus between the 6th and 8th July saw the plot total drop to just 193 adults. Following another spike in numbers on the 9th, counts fell sharply to 143 on the 11th, 92 on the 13th (92 on the 9th in 2017) and 17 on the 16th (16 on the 14th in 2017). The last birds had left Guillemot Cliff by the 14th (the 5th in 2017), Middlerock by the 17th (the 9th in 2017) and North Gully by the 20th (the 17th in 2017); this was the fifth year running in which

birds were later to depart from North Gully, although this may in part reflect the larger breeding population at this site. The four birds occupying North Gully ledges on 19th July were three days later than the last of 2017, two days later than the last of 2016 and one day later than the last of 2015, albeit three days earlier than the last of 2014. Whole Island counts mirrored those made at the plots, with four at the Neck on 20th July the last to be seen ashore (18th July in 2017, the 23rd in 2016, the 25th in 2015 and the 24th in 2014). There were daily sightings at sea until the end of the month, totalling 276 birds, and in August there were records on 24 dates, totalling 3841 individuals and with peaks of 316 on the 18th, 1414 on the 20th and 475 on the 24th; these were by far the highest August totals to date, with a daycount of 70 and a monthly total of 178 being the previous maximums (although a boat trip four miles offshore during August 2017 revealed hundreds of rafting birds).



The number of adults on ledges within three of the plots (standard study period in black).



September counts were also much higher than is typically the case, with records on all but two dates totalling 1419 birds and with highs of 319 on the 8th, 113 on the 14th, 133 on the 22nd and 123 on the 24th; the monthly total was the highest yet to be logged in September and the peak daycount was

only down on the 362 logged on the 24th in 2014, well up on the 2017 peak of 27. Feeding close to the Island proved not without its perils, with a Great Black-backed Gull watched eating a chick on the 9th. Observations on 12 October dates also produced record totals in what proved a remarkable autumn for sightings of this species; a peak daycount of 33 on the 8th topped the previous October record of 30 logged in 1993 and 1981 and the monthly total of 109 topped the 106 logged in 1973. However the 479 distant, unidentified auks logged during the same period, although up on the 131 of last year, was well down on the 2055 of 2016. There were sightings on all but five November dates prior to the departure of staff on the 26th, with highs of 279 on the 9th, 360 on the 11th and 327 on the 16th contributing to a monthly total of 1819 birds; the only higher November counts were in 2015 when a peak of 790 contributed to a monthly total of 1944. Although a return of Guillemots to the breeding ledges in early winter is to be expected, there was no record of this behaviour on Skokholm between 2000 and 2014, despite the fact that staff did not depart until 24th November in 2014 and 16th November in 2013. Although November 2015 saw up to 540 birds return to the cliffs over five dates and 2016 saw up to 216 birds, again on five dates, there were no 2017 landings prior to the 9th November staff departure. This season saw between four and 315 birds return to the cliffs on 11 dates between the 6th and 25th, all at the Jogs with the exception of the 22nd when three were also at Twinlet. Such a return to the colony outside of the breeding season, with the risk of being predated, must have a substantial benefit; it has been suggested that the return may be to secure the best breeding ledges and thus secure the best mate (Harris *et al.*, 2006), but birds ashore may also use less energy than those at sea (Humphreys *et al.*, 2007).

Ringing recovery blue darvic with white 0292

Originally ringed as a pullus, THE AMOS, SKOMER ISLAND, PEMBROKESHIRE June 2016

Recovered SKOKHOLM 7th June 2018

Finding condition Colour ring only in Great Black-backed Gull nest

Distance travelled 4km at 163 degrees (SSE)

Days since ringed 717 (approximately)

Razorbill *Alca torda*

Llurs

Abundant Breeder

44 trapped (including 40 pulli), 1 control

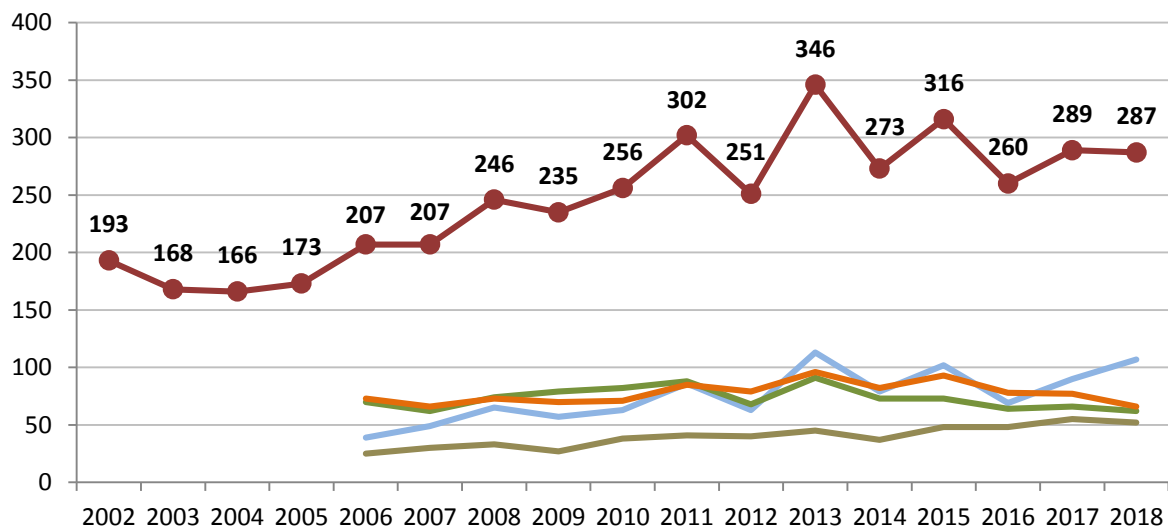
1936-1976: 9220 trapped, 2013-2017: 153 trapped, 4 retrapped, 3 controls

Despite 13 dates from the 6th with fewer than 60 birds logged, the average March daycount was the highest on record; although only fractionally up on 2016 and 2015, the mean was 226.3% up on that of 2014 (the year following the winter wrecks). There were peak counts of 2331 on the 13th, 3712 on the 16th and 2622 on the 21st, the latter two of which became the highest March daycounts on record. By contrast April was quiet, with ten dates when fewer than 80 birds were logged, this compared with only two such dates in 2017. The peak counts of 1612 on the 4th and 1360 on the 8th were well down on an April 2017 peak of 2100 and the April record of 2745. Nevertheless a bird was apparently incubating on Guillemot Cliff on the 25th and an egg was confirmed there the following day, this the same date as the first of 2017, one day earlier than in 2016 and 2015 but 17 days earlier than the first of 2014 (probably again a consequence of the winter storms preceding that breeding season). Laying early potentially comes at a price; an incubating bird at the Quarry on the 28th was the only bird left during an auk exodus, this on the same date as a Raven was watched taking an egg.

Six study plots, established in 2002, were visited on ten dates between the 2nd and 11th June when every adult in suitable breeding habitat was counted. The mean single visit total of adults on ledges was almost identical to that logged last year, with an average of 287 being only 0.7% down on the 289 of 2017 and the fifth highest plot count on record, 1.2% down on the 2011-2018 mean (290.6 ±sd 30.8). There was an average of 17 more birds logged at Little Bay, with a total of 107 the second highest to be recorded at this site (only down on the 113 of 2013); this 18.9% increase masked

declines in the other three main plots. At Middlerock the mean dropped from 66 to 62 and at Guillemot Cliff it dropped from 77 to 66; both totals are notable as equalling the lowest means yet recorded at these sites, matching those observed in 2007. The North Gully mean dropped from 55 to 52, however the total remained the second highest on record, only down on 2017. Why some study plot counts have declined in recent years is not wholly clear; although the 2013-2014 winter wrecks may still be taking their toll, another possible factor is that the study plots, particularly those at Middlerock and Guillemot Cliff, are areas shared with both Guillemots and (perhaps more importantly) Fulmars, species currently increasing on Skokholm as a whole. The number of apparently incubating Fulmar in the Middlerock and Guillemot Cliff plots has almost doubled since 2013, perhaps leading to competition with Razorbills for space within the confines of the plot boundaries. The plot counts are affected by the weather in some years; in the unsettled June of 2012 the totals fluctuated between 164 and 338 birds whereas the 2017 totals, made during a period with fewer rough non-survey days, fluctuated between 253 and 334. A prolonged period of high pressure during 2018 coincided with the tightest spread of totals and the lowest standard deviation of the last six years, with a low count of 263 and a high of 309 (see table below).

The total number of adult birds in all six study plots 2002-2018 (as an average from ten visits) and the totals from the four largest plots (as an average from ten visits).

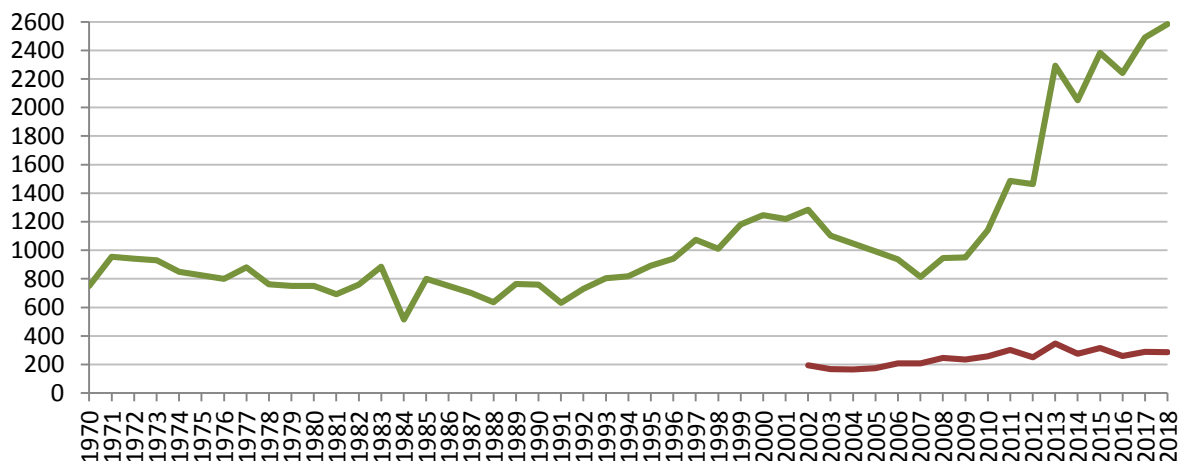


Whole Island counts were made from the land between the 4th and 10th June and a boat-based count was made on the latter date. This was the sixth year running that access to a boat had been available, inevitably leading to higher but more accurate whole Island counts; in 2012 rough seas meant that there was no opportunity for a boat-based count and it was concluded that ‘there remains a section of North Coast that was missed, while other parts of the North Coast and Bluffs were counted less accurately at a distance’ (Gillham and Yates, 2012). A 2018 whole Island total of 2585 adults in suitable breeding habitat was 3.8% up on the 2491 logged in 2017 and the highest total yet recorded on Skokholm (35.4% up on the 2009-2018 mean of 1908.5 \pm sd 595.15). The period of rapid population growth witnessed in recent years has seemingly slowed, perhaps linked in part to the winter wrecks of 2013-2014 which in Pembrokeshire impacted this species more than any other.

The whole Island totals, mean plot totals and the percentage of the Island totals made up of study plot birds 2009-2018. Also the range of plot counts since 2012 and the standard deviation observed over the ten plot visits since 2013. (*includes a boat-based count)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Island	950	1140	1486*	1463	2294*	2052*	2382*	2242*	2491*	2585*
Plots	235	256	302	251	346	274	316	260	289	287
Range				164-338	301-397	254-315	291-346	236-324	253-334	263-309
\pmSD					30.54	19.96	15.78	26.58	25.61	13.25
Plot %	24.8	22.5	20.3	17.2	15.1	13.4	13.3	11.6	11.6	11.1

The total number of Razorbills (adults on ledges) recorded on Skokholm since 1970 and the number of birds within the study plots since 2002.

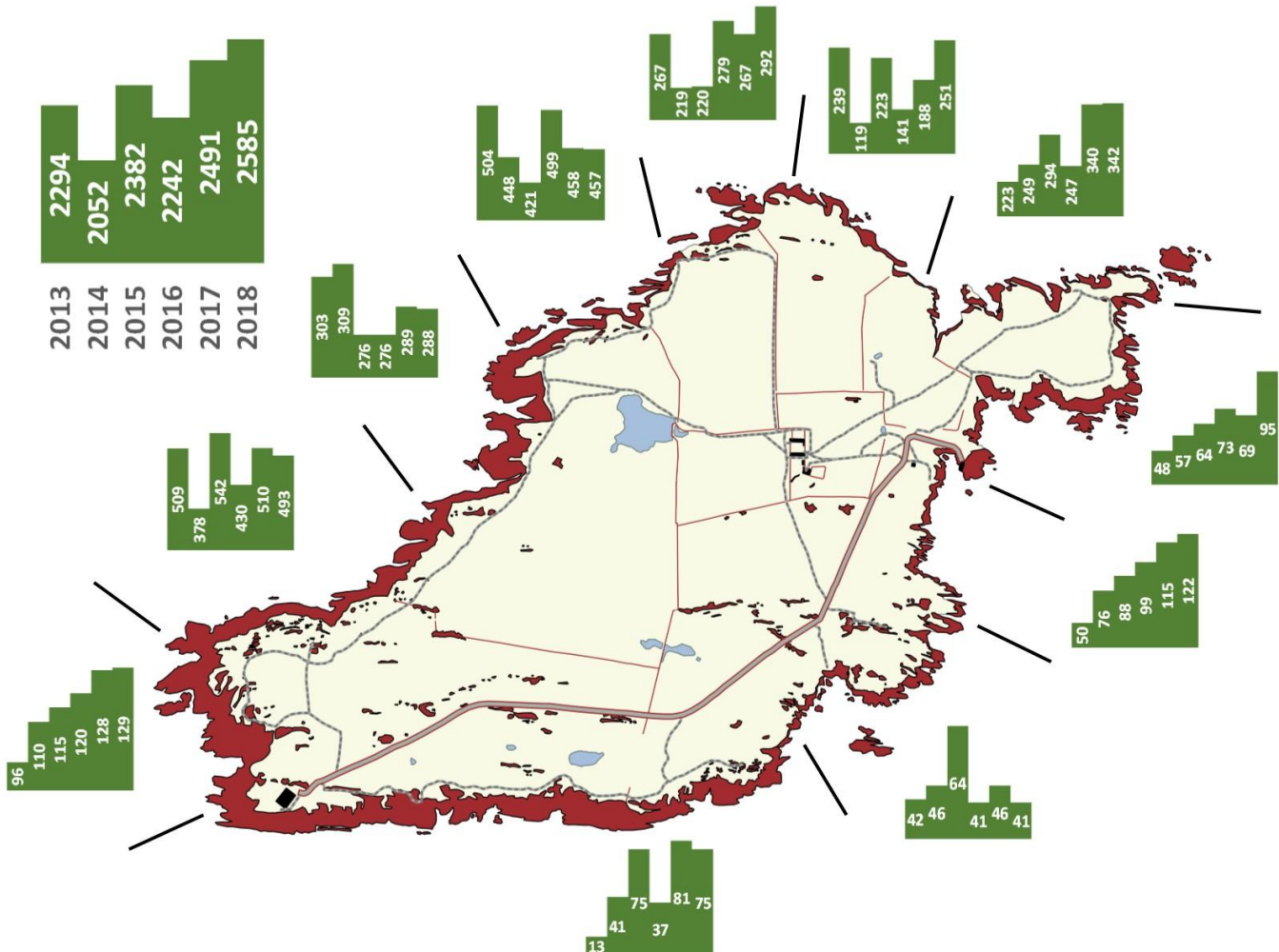


The proportion of the whole Island total made up of study plot birds was the lowest since the plots were initiated in 2002, suggesting that the plot limiting factors outlined above, particularly the competition for space in and around Twinlet, are not affecting the Island as a whole. As can be seen from the map below, the largest increases came along Near and Far Bays (63 more birds), along the south coast of the Neck (26 more) and at Little Bay (25 more); two of these areas are the same as those which saw the largest increases in Guillemot numbers. The largest decline occurred around the Bluffs, with a mean of 17 fewer visible adults, however this area is the most problematic to survey on Skokholm with a complex landscape of boulders complicating the counts.

Productivity monitoring was undertaken for a sixth year running. There are currently concerns among ICAC members that recent Pembrokeshire productivity estimates have been quite low (on Skokholm ranging between 0.21 in 2015 and 0.66 in 2013), perhaps lower than what actually occurred given the continued growth of the population and certainly too low to maintain the expansion. One explanation for low productivity estimates could be that the plots, particularly the exposed Neck plot where predation levels are often very high, are not representative of the Island as

a whole. With this in mind an additional cliff plot was established in 2017 and was again used this year. There were thus three survey areas, one a cliff below the Neck Razorbill Hide where 28 incubating pairs were located by 15th May, one at North Gully where 29 pairs were located by 27th May and one a site among the Bluffs boulder slope where 48 egg sites were marked on 19th May.

The distribution of Razorbills on suitable breeding ledges 2013-2018.



At the Neck there were four failures at egg stage; one of these went missing prior to the hatching period, one was abandoned in a puddle prior to the hatching period and two, perhaps damaged or infertile eggs, were abandoned when most other pairs had large chicks. Remarkably there were no failures during chick rearing, meaning that 24 young reached jumping age at the Neck. The resulting productivity figure of 0.86 is the highest to be observed at this site, well up on the 0.14 recorded in 2017 (there were 0.03 jumplings per pair in 2016, 0.17 in 2015, 0.36 in 2014 and 0.77 in 2013). The new cliff site at North Gully saw six failures at egg stage prior to the hatching period and five failures at chick stage, all of which went missing; predation by gulls was suspected as the reason for chick stage failures. The resulting productivity value of 0.62 jumplings per pair was fractionally up on the 0.58 logged at this site in 2017. The combined productivity value for cliff nesting pairs was 0.74, a figure only exceeded by the 0.77 of 2013.

Among the Bluffs boulders six pairs failed at egg stage, with two of the eggs found abandoned rather than disappearing. A further six pairs failed with either eggs or small chicks and seven pairs failed with chicks (one of which was found dead and abandoned rather than going missing). There were 29 pairs which produced a jumping-sized chick; the resulting productivity value of 0.60 jumplings per pair was up on the 0.48 of 2017, the 0.29 of 2015, the 0.44 of 2014 and the 0.55 of 2013 but down

on the 0.74 logged in 2016. For a sixth year running the last of the breeding attempts within the boulders were concluded before the last of the attempts on the cliffs; this perhaps reflects a tendency for large chicks among the boulders to move away from the egg site, whilst cliff chicks have little room for movement.

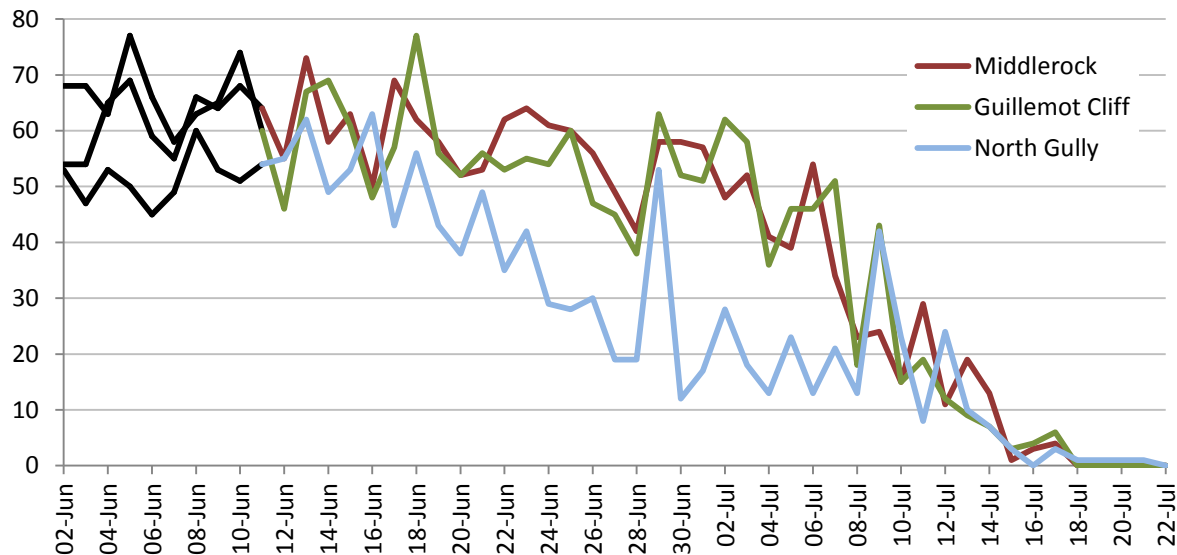


Combining the productivity figures for the cliff plots and the boulder plot to give an indication of overall productivity on Skokholm can be achieved in two ways, either by averaging the final values obtained for the three sites, as recommended in the Seabird Monitoring Handbook (Walsh *et al.*, 1995), or by combining all the data from the three plots (that is to say by dividing the total number of jumplings at all sites by the total number of monitored sites). The former, preferred, technique produces a productivity estimate of 0.69 jumplings per pair and the latter 0.68; this is the highest estimate of the last six years, up on the 0.40 of 2017, the 0.39 of 2016, the 0.21 of 2015, the 0.40 of 2014 and the 0.66 of 2013.

For a fifth year running counts at three of the study plots were continued beyond the normal study period to ascertain the pattern of colony attendance during the remainder of the breeding season (see chart below). There were again fluctuating numbers in all three subcolonies and regular peaks when the totals were presumably augmented by the return of failed adults, successful females or non-breeding birds; interestingly these peaks were again broadly consistent between subcolonies, and to a lesser extent coincided with Guillemot arrivals, suggesting that the returning birds respond to the same environmental cues. The first jumpling had departed the productivity plots by 22nd June, the same date as in 2016, two days later than last year and four days earlier than in 2015. Whereas all but one productivity chick had departed by 3rd July in 2017, seven chicks (6.7%) were still present on the 7th this year; the 2018 jumping period extended later than that observed in the previous two years, but was earlier than in the late 2014 season when 40% of young remained on 7th July. The number of adults within the plots dropped steadily during the month, with only double-figure counts logged from the 10th (11th July in 2017, the 14th in 2016, the 8th in 2015 and the 17th in 2014) and single-figure counts from the 18th (the 22nd in 2017, the 25th in 2016, the 22nd in 2015 and the 27th in

2014). Elsewhere there were still three birds present ashore on 24th July, the date which in the previous three years had seen the last adults on cliffs; two of the birds remained until the 27th and one until 2nd August, two days later than the last of the late 2014 season.

The number of adults on ledges within three of the plots (standard study period in black).



There were records of birds at sea on a further 18 August dates, totalling 388 birds and with highs of 114 on the 20th, 75 on the 21st and 39 on the 24th; both the August total and maximum daycount were all time highs, up on the August 1962 total of 108 which included a daycount of 50. Although down on the record totals logged in 2017, when a peak daycount of 1148 contributed to a monthly total of 1708, September counts were again high. There were sightings on 23 September dates, totalling 575 birds and with peak daycounts of 67 on the 8th, 72 on the 18th and 127 on the 23rd; the monthly total was the third highest on record and the maximum daycount the eighth highest. Subsequent counts were more typical, with 179 birds logged over 14 dates in October and 198 over ten dates in November; no birds were seen to return to the breeding ledges. Further large auks were present at sea during the autumn but they remained unidentified due to their distance from the Island; there were 2613 in September, 479 in October and 1065 up until 26th November.

Ringling recovery M93635

Originally ringed as a chick, SKOMER ISLAND, PEMBROKESHIRE 24th June 1999

Recovered SKOKHOLM 27th April 2018

Finding condition Metal ring read in field

Distance travelled 4km at 163 degrees (SSE)

Days since ringed 6882

Puffin *Fratercula arctica*

Pâl

Very Abundant Breeder

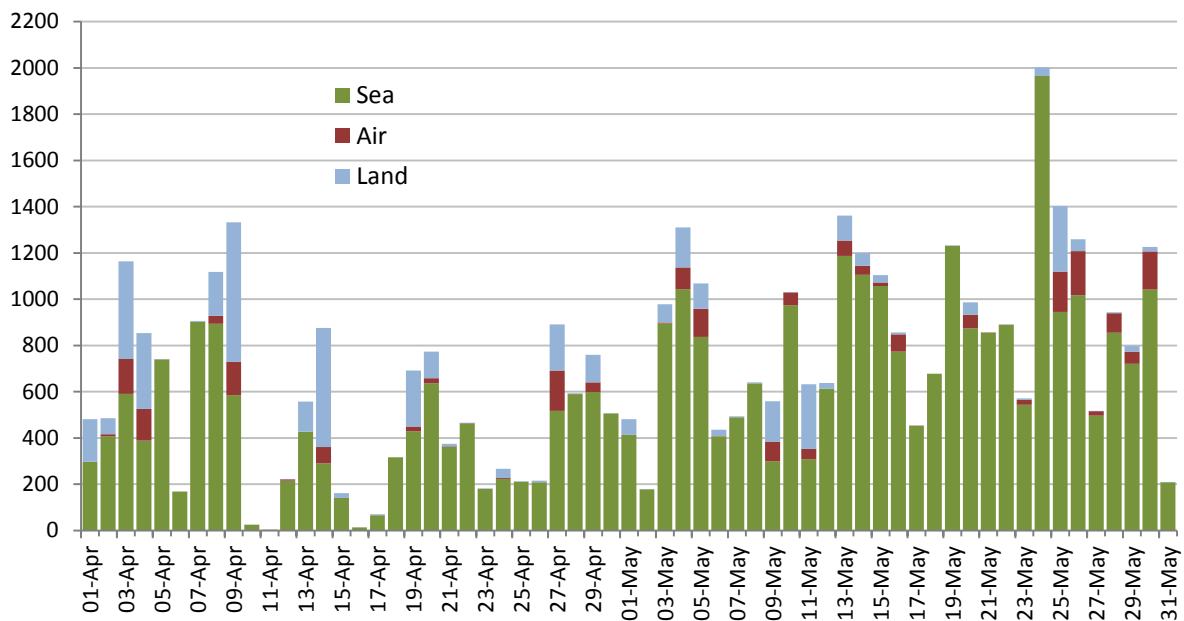
53 trapped (including 5 pulli), 4 retrapped

1936-1976: 5411 trapped, 2011-2017: 497 trapped, 17 retrapped, 1 control

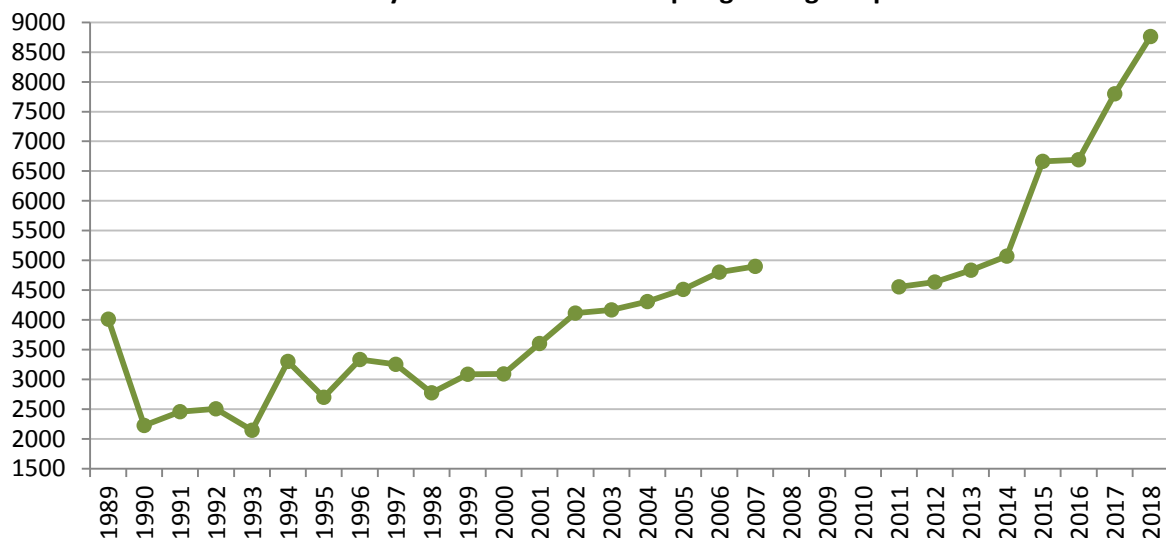
A minimum of 46 birds rafting along the north coast on 16th March were two days later than the first of last year; although earlier birds have been seen in 12 previous years, and the first of the year has been noted on the 16th in a further six, there have only been more birds logged by this date in two years (2017 and 2012). Although down on the 9164 of last year and the 12074 of 2012, the March total of 7980 proved the third highest since 1960. The bulk of the March total was made up of raft counts of 1302 on the 21st, 3445 on the 22nd and 1766 on the 30th, with the largest count including at

least 28 birds ashore in Peter’s Bay; a 22nd March landfall was one day earlier than the first of last year and between nine and 15 days earlier than in the four years prior to that, but two days later than in 2012. April counts varied dramatically with highs of 2728 on the 8th, 6656 on the 9th and 2976 on the 14th, but lows of 249 on the 6th, 48 on the 10th, nine on the 11th and 28 on the 16th. The 9th April peak was the second highest April total since daycounts of 10000 were logged in 1953 and 1950, only down on the 6692 of 13th April 2016. A Raven was watched as it caught and killed a Puffin above North Haven on 20th April; this was the first time that such an attack has been witnessed on Skokholm for at least six years. Daily counts were again made from around the Neck each evening, from 1st April until 31st May, to record the pattern of colony attendance (see chart below).

The number of Puffins seen from the Neck between 1st April and 31st May 2018. The transect again began from a line due north of North Haven and finished at Peter’s Bay. The counts on the 1st, 6th and 7th May were severely impacted by the weather.



The maximum Puffin daycount recorded each spring during the period 1989-2018.

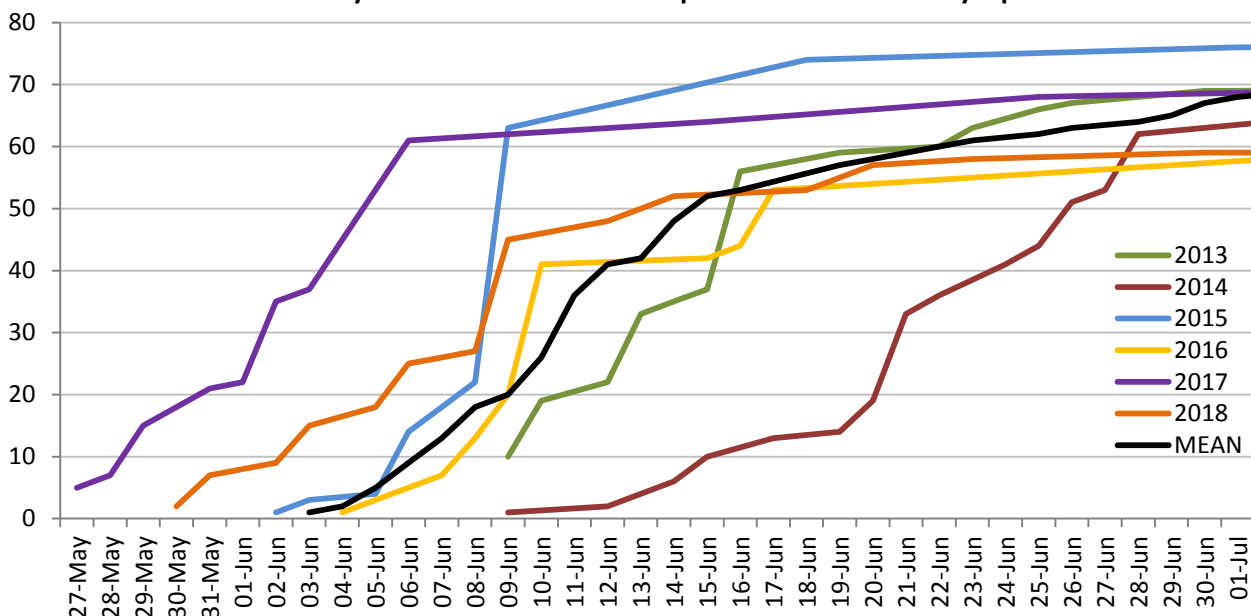


The maximum whole Island count coincided with the highest count from the Neck for the fourth year of the last five. A whole Island total of 8762 logged on 24th May (with 3882 birds to the south and 2878 to the north, in addition to the Neck count), was 12.3% up on the 2017 total and the highest spring count since the early 1950s; numbers are however still well down on Lockley’s pre-

War spring estimates of approximately 40000. Although the whole Island counts provide a relatively consistent long-term method for monitoring the trend in numbers, how the totals reflect the Skokholm breeding population is difficult to ascertain. The Crab Bay count for the evening of 24th May was 1052 birds, however more focused monitoring at this site revealed a study population of 61 burrows in an area which comprises approximately 10% of the colony and where less than half of the active burrows in that area were study burrows; thus we might predict a very rough minimum of 1220 pairs for Crab Bay (as active burrow distribution is apparently quite even) and expect more than twice the number of birds to be using this area of sea than were logged during the peak whole Island count. Ad hoc evidence of colony expansion came from the north coast where Puffins were occupying burrows to the inland side of the coastal path for the first time in recent memory.

A productivity plot established at Crab Bay in 2013 was used for a sixth season. The majority of the 100 burrows individually numbered in 2013 were again used this year, although a small number of posts were repositioned due to either winter losses or subsequent excavations making it difficult to tell which hole was marked. Of these, 61 were seen to be occupied and were visible throughout the season (69 in 2017); productivity estimates are based on observations of these burrows. Two active burrows (3.28%) were not seen to be provisioned with fish and it is assumed that these failed at egg stage (5.80% in 2017, 7.58% in 2016 and 5.00% in 2015). The first fish delivery witnessed anywhere this year was on 21st May (24th May in 2017, 29th May in 2016, 31st May in 2015, 3rd June in a post-wreck 2014 and 30th May in 2013), but it was not until 30th May that fish were seen to be brought to the study plot (see below graph for first plot delivery dates logged in previous years). The cumulative total of provisioned burrows was slightly slower to accrue than during the very early 2017 season, although the tally remained approximately four days ahead of the six year mean. The 2018 chick feeding period was approximately two weeks earlier than in 2014, the breeding season which followed the most severe winter storms recorded during this study.

The number of study burrows which had been provisioned with fish by a particular date.



Although the study plot was visited for a minimum of one hour every day, it certainly cannot be assumed that the first and last fish provisioning was seen for each burrow. Indeed the daylight hours Puffin watches highlight how some burrows are provisioned infrequently (see table below). Additionally it proves difficult to standardise ad hoc recording effort between years. It was thus decided in 2016 that a three visit method would be used to calculate productivity on Skokholm, but that five visits and ad hoc records would still be collected to allow further comparisons to be made in the future (see below table and the 2016 Seabird Report for more details). This is more in line with

the Seabird Monitoring Handbook (Walsh *et al.*, 1995) which states that, when monitoring Puffin productivity in colonies where the nest is inaccessible and the colony is shared with Manx Shearwaters, the most appropriate technique is ‘When birds are feeding large chicks, make a few watches to determine which burrows/crevices have fish taken down them’. Establishing which burrows contain large chicks is inevitably the main issue with this technique, necessitating earlier watches to detect chick hatching dates.



Calculating productivity using only three daylight watches. The first watch was between the 6th and 28th June (dependent on the date of first fish delivery that year), the second between 25th June and 8th July and the third between the 12th and 24th July. Chicks are assumed to have fledged if fed on a minimum of two watches. Ad hoc productivity is based on a chick reaching 31 days.

	First fish in plot	Last fish in plot	Fed watch 1 & 2	Min. chick age	Fed watch 2 & 3	Min. chick age	Fed all 3 watches	Min. chick age	Prod. based on 3 watches	Ad hoc prod.
2018	30-May	30-Jul	20	22 (9/6 - 30/6)	11	18 (30/6 - 17/7)	15	39 (9/6 - 17/7)	0.75 (46 of 61)	0.56
2017	27-May	30-Jul	33	20 (6/6 - 25/6)	6	18 (25/6 - 12/7)	16	37 (6/6 - 12/7)	0.80 (55 of 69)	0.57
2016	04-Jun	13-Aug	7	16 (17/6 - 2/7)	3	13 (2/7 - 14/7)	38	28 (17/6 - 14/7)	0.73 (48 of 66)	0.64
2015	02-Jun	05-Aug	16	14 (18/6 - 1/7)	2	12 (1/7 - 12/7)	42	25 (18/6 - 12/7)	0.75 (60 of 80)	0.55
2014	09-Jun	06-Aug	14	11 (28/6 - 8/7)	4	17 (8/7 - 24/7)	38	27 (28/6 - 24/7)	0.74 (56 of 76)	0.50
2013	09-Jun	14-Aug	11	15 (16/6 - 30/6)	6	14 (30/6 - 13/7)	39	28 (16/6 - 13/7)	0.73 (56 of 77)	0.49

Puffins can fledge having spent a minimum of 34 days as a burrow-bound chick, although this is more typically 38 days and can be anything up to 60 days (Ferguson-Lees *et al.*, 2011). A flaw with the three visit technique is that some chicks could potentially be counted as fledged when they had reached as little as 18 days old. However it would be incorrect to assume that only those provisioned on all three watches went on to fledge as early hatchers could potentially have departed by the third watch whilst others may have hatched after the first watch. Although this three visit technique is more standardised than the ad hoc recording, the 2013 to 2018 productivity estimates of between 0.73 and 0.80 fledglings per pair certainly include birds which did not fledge. For example a bird counted as fledged last year was known to die of an apparent eye injury at approximately 25 days old, whilst this year larger chicks were seen to be taken by Great Black-backed Gulls. Nevertheless this more standardised monitoring method suggests that 2018 productivity was in line with recent years, indeed it matched the six year mean. If the ad hoc records are included and it is assumed that a chick seen to be provisioned for 31 days or more was of fledging size, then the 2018 data suggests that, of the 61 monitored breeding attempts, perhaps as few as 34 (55.7%) were potentially successful (56.5% in 2017, 63.6% in 2016, 55.0% in 2015, 50.0% in 2014 and 49.4% in 2013), although at least 47 attempts saw a chick reach a minimum of 26 days (77.0%, see table below).

The number of days between first and last observed chick feeding based on ad hoc recording and five daylight hours watches.

Days	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-53
No. of burrows	3	1		5	3	13	12	6	7	9

The number of fish deliveries to known active burrows during five daylight watches.

No. of deliveries	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No. of burrows 9 June		5	5	6	4	6	3	4	1	2	1				1
No. of burrows 20 June		6	5	8	7	8	5	5	2	2	2				
No. of burrows 30 June	3	9	13	7	11	6	2	1							
No. of burrows 7 July	3	10	7	3	4	8	3	2	2	2			1	1	
No. of burrows 17 July		8	2	4	3		2	1	2	1			1	1	



Whilst the above productivity estimates attempt to deduce the number of fledging-sized birds, fledging success is almost impossible to ascertain reliably. Puffin chicks are particularly vulnerable

when exercising their flight muscles at the burrow entrance prior to fledging and when making the journey to the sea. Great Black-backed Gulls were seen patrolling within the colonies during the chick provisioning period and were regularly watched taking fledging-sized Pufflings; for example guests at Crab Bay saw seven Pufflings eaten on the morning of 11th July and five on the 17th (two of which were taken by Lesser Black-backed Gulls).

The five daylight hours watches (made on the 9th, 20th and 30th June and the 7th and 17th July), were also used to monitor kleptoparasitism by gulls. The study plot was again confined to the area of the 100 numbered burrow stakes at Crab Bay. On 9th June 701 Puffins arrived to the study area with fish and of these 19 (2.71%) were successfully robbed. On 20th June 852 birds arrived and 12 (1.41%) were robbed. On 30th June 527 birds arrived and eight (1.52%) were robbed. On 7th July 511 birds arrived and again eight (1.57%) were robbed. On 17th July 359 birds arrived and 33 (9.19%) were robbed. It should be noted that these figures do not take into account the number of fish lost to gulls at sea or on the approach to the colony.



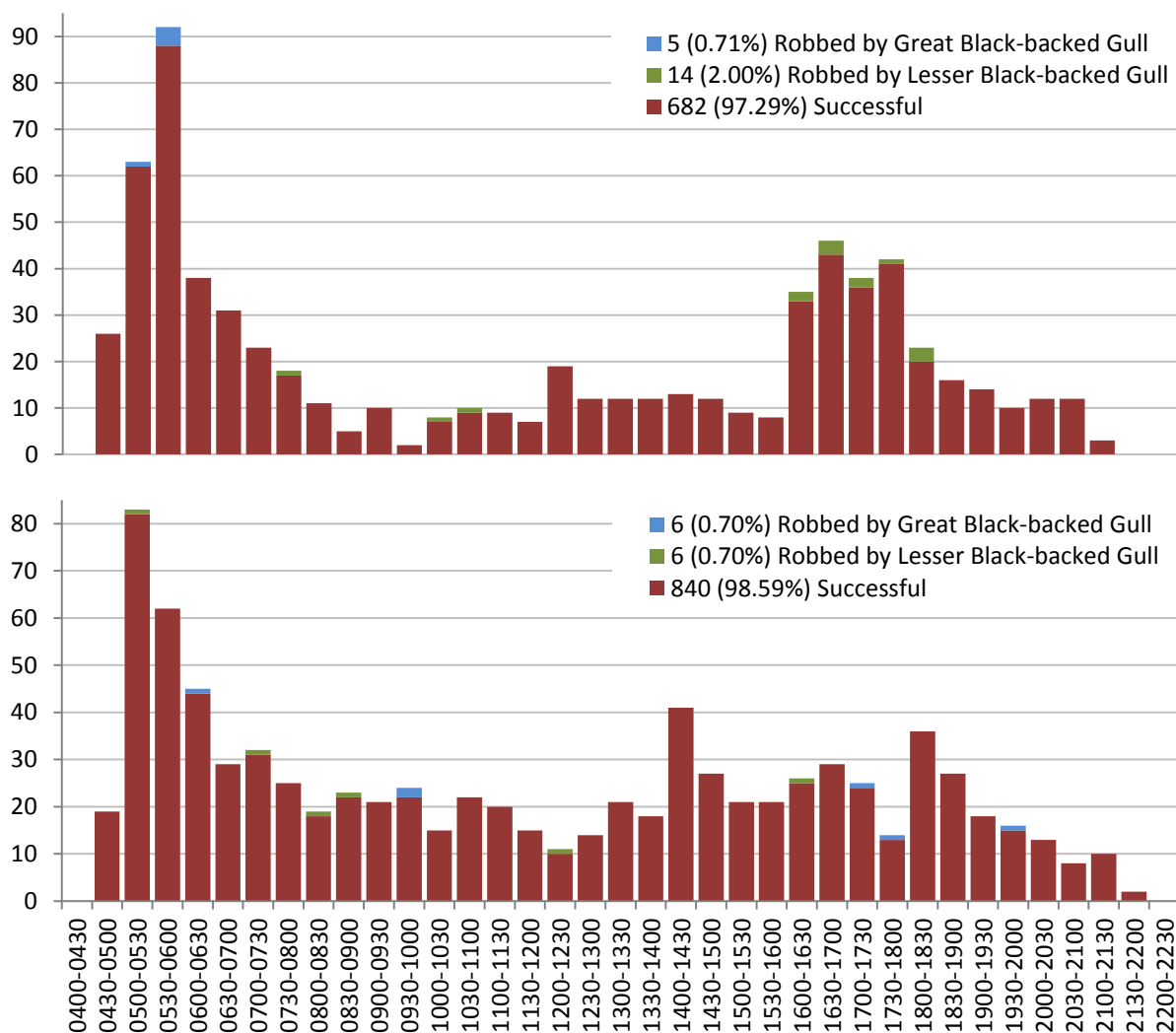
The number of fish deliveries made to the study plot during each daylight hours watch, the number of Puffins which lost fish over the plot and the percentage which lost fish.

		Watch 1	Watch 2	Watch 3	Watch 4	Watch 5	Total
2018	Number of deliveries	701	852	527	511	359	2950
	Number parasitised	19	12	8	8	33	80
	Percentage parasitised	2.71	1.41	1.52	1.57	9.19	2.71
2017	Number of deliveries	844	991	1100	527	177	3639
	Number parasitised	30	11	3	7	5	56
	Percentage parasitised	3.55	1.11	0.27	1.33	2.82	1.54
2016	Number of deliveries	421	733	889	489	525	3057
	Number parasitised	20	45	35	10	28	138
	Percentage parasitised	4.75	6.14	3.94	2.04	5.33	4.51
2015	Number of deliveries	699	927	916	521	123	3186
	Number parasitised	43	34	23	10	4	114
	Percentage parasitised	6.15	3.67	2.51	1.92	3.25	3.58

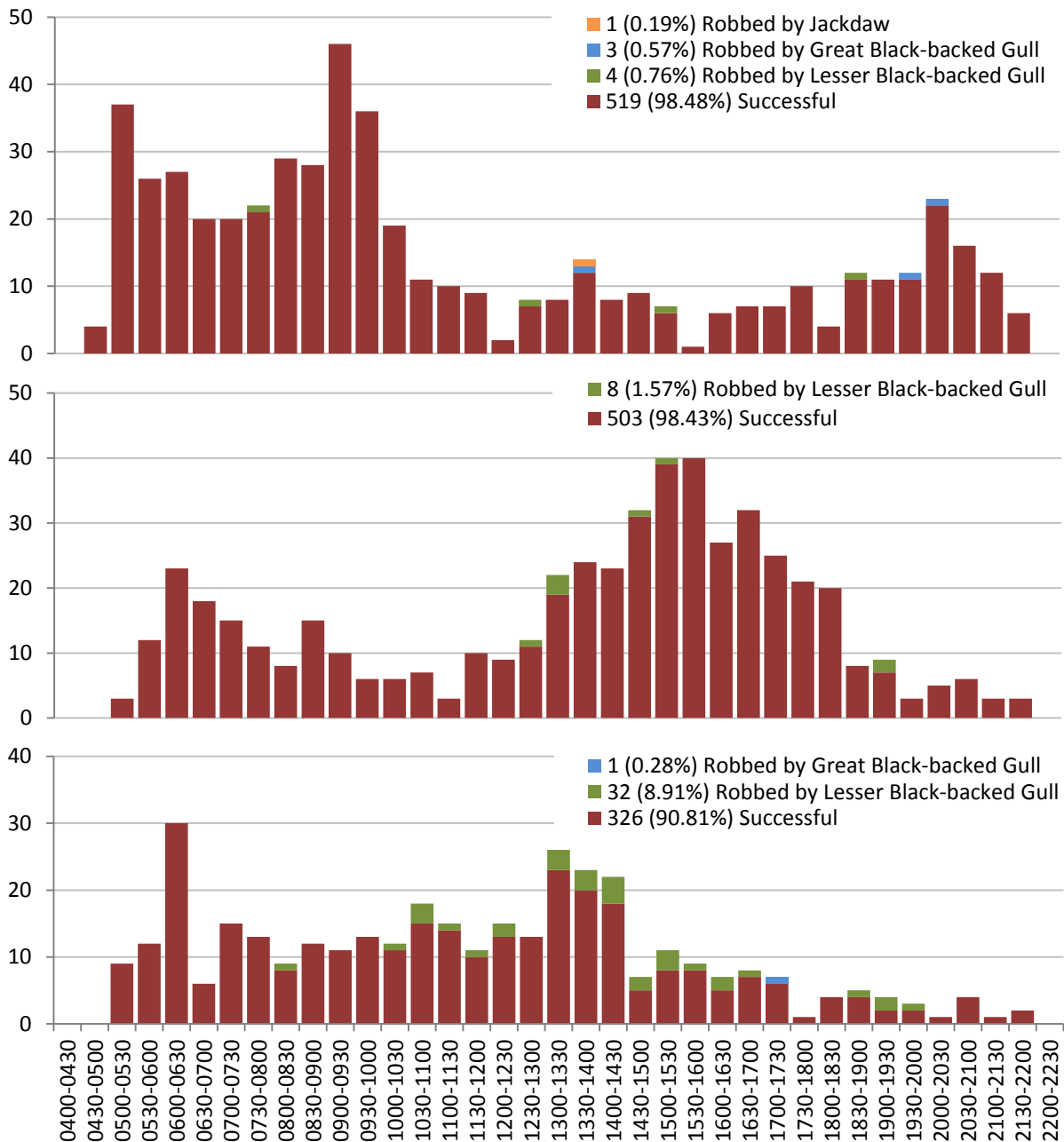
2014	Number of deliveries	262	513	643	670	179	2267
	Number parasitised	28	37	29	3	1	98
	Percentage parasitised	10.69	7.21	4.51	0.45	0.56	4.32
2013	Number of deliveries	413	684	610	107		1814
	Number parasitised	76	40	32	11		159
	Percentage parasitised	18.40	5.85	5.25	10.28		8.77

In terms of the percentage of deliveries lost over the study plot, the 17th July peak in monitored kleptoparasitism logged this year was the highest of the last four years, however the actual number of deliveries stolen, although up on 2017, was otherwise the lowest of this six year study. This general decline in kleptoparasitism is perhaps in part due to a reduced Lesser Black-backed Gull population, although an increase in Great Black-backed Gull numbers may at the same time be having an effect, with the more aggressive large gulls keeping the Herring and Lesser Black-backed Gulls from the study area. The highest levels of kleptoparasitism to be logged so far occurred in 2013. Given that the size of the study plot has remained constant during this study, it is also interesting to note a generally upwards trend in the number of annual deliveries (although the total was somewhat down this year); although annual variations in Puffin productivity and the timing of the breeding season will influence the number of deliveries to the study area on each visit, these figures perhaps support the theory that the population here is increasing.

The number of chick provisioning attempts during daylight on the 9th and 20th June 2018, along with the number of times that gulls successfully robbed the fish.



The number of chick provisioning attempts during daylight on 30th June and the 7th and 17th July 2018, along with the number of times that gulls or Jackdaw successfully robbed the fish.



A colour ringing project was begun at Crab Bay in 2011 to allow an estimate of adult survival to be made each year. There were 128 birds ringed in the first year, 58 in 2012, 51 in 2013, 57 in 2014, 23 in 2016, 24 in 2017 and a further 31 were added to the scheme this year. The table below summarises the resighting data collected so far. What is apparent is that some birds are not seen every year, perhaps because they have not returned to the study plot or perhaps because their colour rings have not been seen (which may well be the case in years where the vegetation is longer); we now know for example that the 155 birds seen in 2013 was only 93.37% of the number actually alive. The survival estimates for more recent years are thus likely to be modified in the future, to take into account birds which have not yet been seen. Nevertheless, with seven years of resighting data now available, we can start to look at fluctuations in survival over time. The proportion of birds surviving the winter during the period 2011 to 2018 has varied between 79.72% (in 2014) and 96.51% (in 2013), with only the 2014 return rate being below 89%. A flaw with this survivorship estimate is that colour marks were added to Puffins caught in flight, individuals

potentially resident in areas not visible to researchers; a better estimation of survival may therefore come from looking for birds previously seen in the field (thus discounting individuals in the year after ringing). The resulting survival estimates range from 80.12% (in 2014) to 97.37% (in 2013), with only the 2014 return rate being below 91%. Clearly the most striking feature of these estimates is the substantial drop noted after the severe 2013 to 2014 winter wrecks; it remains to be seen how often such drops in survival can occur before the spring raft counts show a decline in overall numbers.

Survival in adult Puffins. An average survival figure for each year is based on the number of birds ringed in the preceding year plus the number of previously ringed birds known to be still alive, for example 166 birds are now known to have been alive in 2013, of a 2012 total of 172 (58 ringed in 2012 plus 114 ringed previously and known to be alive). Survival after a one year establishment period means that birds have been seen within the study area before (and are therefore assumed to be located in visible positions); birds ringed in the preceding year are therefore excluded from the calculations as they may be occupying hidden areas of the colony.

	2011	2012	2013	2014	2016	2017	Total	Survival after one year
Total Ringed	128	58	51	57	23	24	341	
Seen in 2012	72						72	
Alive in 2012	114						114	
% survival	89.06						89.06	No data
Seen in 2013	103	52					155	
Alive in 2013	111	55					166	
% survival	97.37	94.83					96.51	97.37
Seen in 2014	86	36	37				159	
Alive in 2014	93	40	40				173	
% survival	83.78	72.73	78.43				79.72	80.12
Seen in 2015	79	37	35	50			201	
Alive in 2015	86	39	37	53			215	
% survival	92.47	97.50	92.50	92.98			93.48	93.64
Seen in 2016	68	34	32	43			177	
Alive in 2016	78	37	35	47			197	
% survival	90.70	94.87	94.59	88.68			91.63	91.63
Seen in 2017	72	35	31	44	19		201	
Alive in 2017	76	36	32	44	19		207	
% survival	97.44	97.30	91.43	93.62	82.61		94.09	95.43
Seen in 2018	70	34	28	40	19	20	211	
Alive in 2018	70	34	28	40	19	20	211	
% survival	92.11	94.44	87.50	90.91	100.00	83.33	91.34	92.27

The colour ringing project revealed an interesting case of ‘progressive greying’ last year. Although the Puffin pictured below (Black and White stripe over BTO EX83523, Yellow over Black) may appear to be leucistic, with predominantly white feathers in the throat, nape and mantle, we know from previous years that this bird had the appearance of a normal Puffin. Interestingly the extent of the white plumage did not seemingly change between the 2017 and 2018 breeding seasons. This condition is caused by a progressive loss or failure of pigment cells with age.

There were several higher counts during July when large numbers of young adults arrived, many of which were carrying fish. It was perhaps one of these less experienced birds which was eaten by a Great Black-backed Gull on the 23rd; although Puffins are regularly taken during the spring, we rarely record adult deaths during the chick fledging period. There was a distinct change in behaviour from the 23rd, with lots more head waving within the plot and more mass departures, although it was not until the last three days of July that the majority of birds stopped returning to the colony. There

were 28 fish deliveries to the west side of Crab Bay in five hours of observations on 30th July, this compared with 24 in the same period last year. There followed August highs of 567 on the 1st and 269 on the 4th (the 2017 August high was 43 on the 3rd), before numbers dropped to ten or fewer from the 8th. Two fish deliveries to South Haven on the 10th were the last to be seen this year, these on the same date as the last of 2017, three days earlier than the last of 2016, six days earlier than in 2015 and 13 days earlier than in 2014 (the latest breeding season in recent years). Up to four birds were noted on eight further dates to the 19th, with a single off Howard's End on the latter date being the last of the year; there was no September record for only the third time in the last eight years.



Ringing recovery EX83632

Originally ringed as an adult, CRAB BAY PUFFIN PLOT, SKOKHOLM 1st July 2011

Recovered SULE SKERRY, ORKNEY 12th July 2018

Finding condition Intentionally taken

Distance travelled 823km at 4 degrees (N)

Days since ringed 2568

Ringing recovery left tarsus white over white, right tarsus grey stripe over EZ85715

Originally ringed as an adult, CRAB BAY PUFFIN PLOT, SKOKHOLM 6th July 2018

Recovered HIGH CLIFF, SKOMER ISLAND, PEMBROKESHIRE 14th July 2018

Finding condition Colour rings read in field

Distance travelled 4km at 343 degrees (NNW)

Days since ringed 8

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Storm Petrel heading left, Storm Petrel heading for the camera and Manx Shearwater over the Lighthouse Plot, all captured using infrared photography © Bart Vercruyse & Pol Dewulf, Guillemot defending egg against Great Black-backed Gull © Colin Fieldgate, loafing Puffin © Miles Tindal, Herring Gull with Puffin © Richard Coles and Manx Shearwaters and a Storm Petrel over the Quarry Path © Nick Davison

All other photographs © Richard Brown and Giselle Eagle

Report compiled by Richard Brown and Giselle Eagle

